HP Performance Optimized Datacenter 20c Maintenance and Service Guide—China

Abstract

This guide provides maintenance and service guidance for the HP Performance Optimized Datacenter 20c (HP POD 20c).

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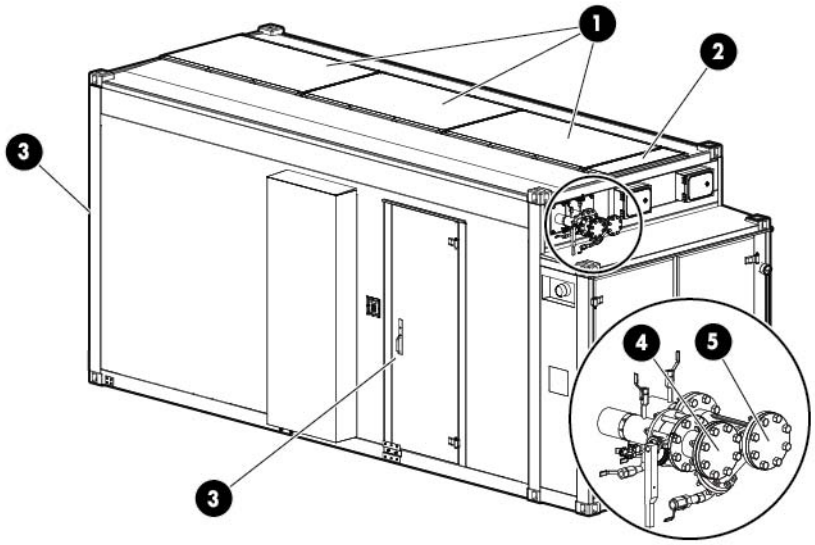
Illustrated parts catalog

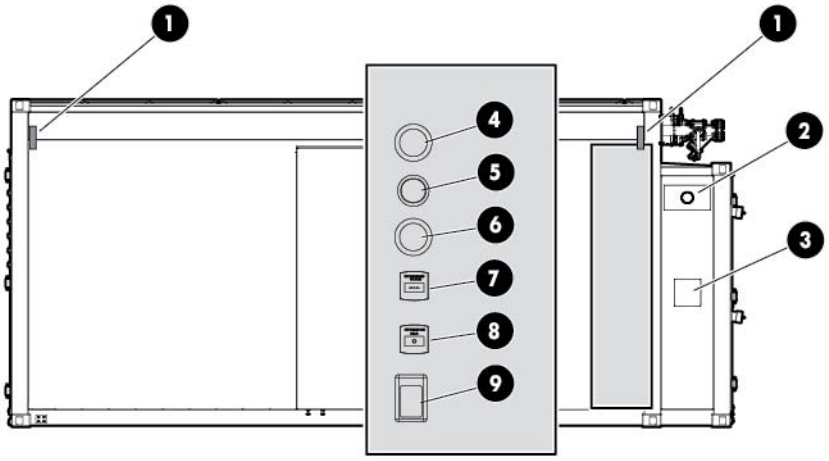
Structural component identification

The HP POD 20c documentation frequently refers to the specific components of the HP POD 20c as shown in the following figure and described in the following table.



Item	Component	Description
1	Heat exchanger access hatches	Provides access to the overhead heat exchangers
2	Power busway access hatch	Allows access to the power busway end feed boxes
3	Personnel access doors	Provides access to the POD
4	Facility chilled water return	Facilitates the return of chilled water to the POD
5	Facility chilled water supply	Facilitates the supply of chilled water to the POD

Life safety component identification

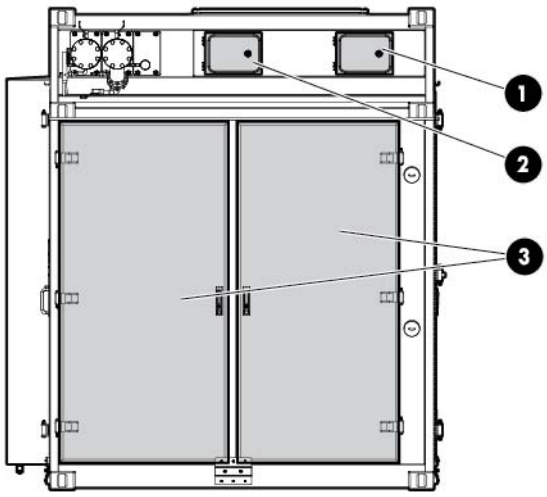


Item	Component	Description
1	Exit sign locations	Indicates the location of an exit
2	EPO strobe	Red—An EPO event occurred and the HP POD 20c shut down.
3	EPO button	Enables manual initiation of the EPO system
4	EPO alarm	Indicates the initiation of the EPO system with an audible alarm
5	Fire strobe light	Indicates a fire alarm condition within the HP POD 20c
6	Fire suppression alarm	Indicates the initiation of the fire suppression system with an audible alarm
7	Fire alarm manual pull*	Enables manual initiation of the fire system, which includes activating the interior and exterior fire strobe lights and the optional fire suppression system
8	Fire suppression abort button*	Aborts the fire suppression system. A fire suppression abort button is located next to each personnel door.
9	EPO button	Disconnects the HP POD 20c from main power, activates the red EPO indicator on the control cabinet door, and activates the red EPO strobe on the HP POD 20c exterior. To restart the HP POD 20c after an EPO event, you must reset the EPO button by turning the key and switching the button to the Active position.

*This is an optional component that might not be included.

Electrical power component identification

Front view shown

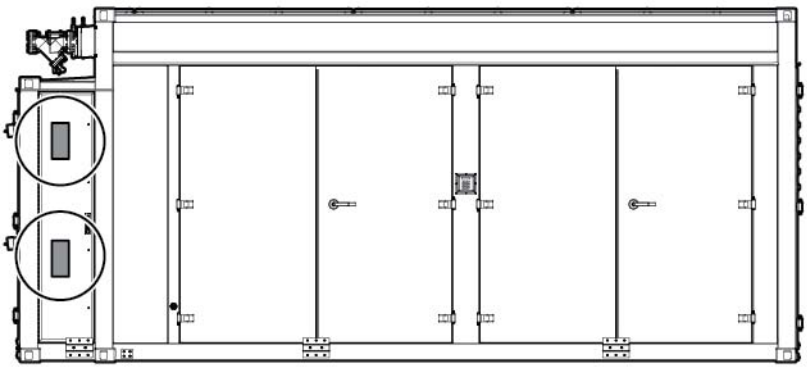


Item	Component	Description
1	Demarcation box*	Customer communication connection point for the following components: • ECS • Security • Phone
2	Fire box*	Connection location for fire emergency and VESDAnet signals
3	380-415 VAC Y, 3-phase, 400 A	Feed A and B power for IT critical loads busways and house power

*The demarcation box and the fire box are communication data points that are provided on the POD by HP. Connecting these data points is the responsibility of the customer, unless an approved Statement of Work is initiated.

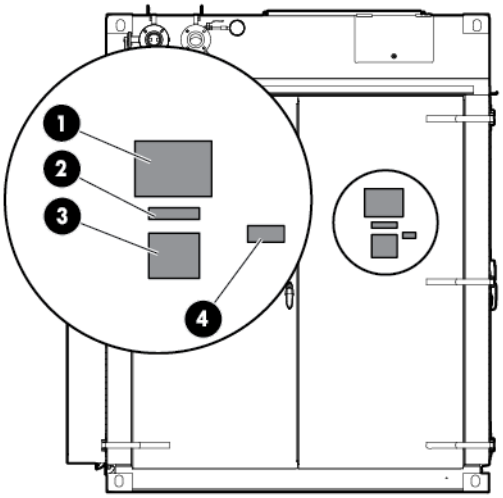
Main breaker locations

Side view shown



External panel labels

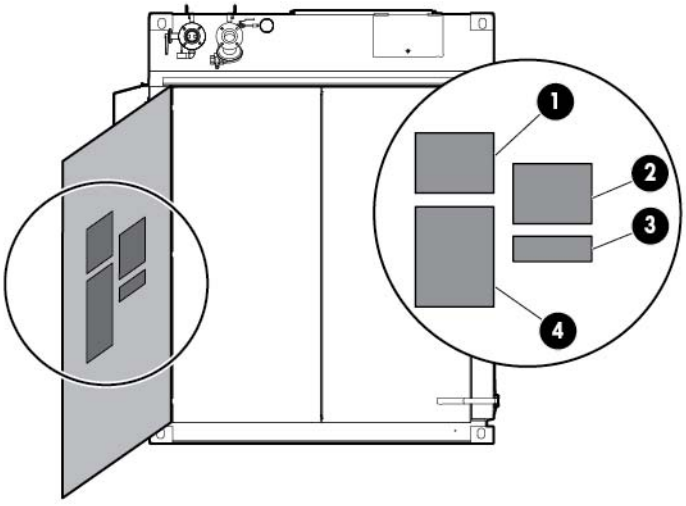
Front view shown



Item	Electrical safety label	Description
1	Danger sign	Provides a reminder to users that the electrical panels must be accessed only by authorized personnel
2	Disconnect label	Provides the order for disconnecting the electrical panels
3	Caution	Cautions users about isolating power from the HP POD 20c.
4	Arc flash warning	Provides a reminder to users of the danger of arc flash and required PPE

Internal panel labels

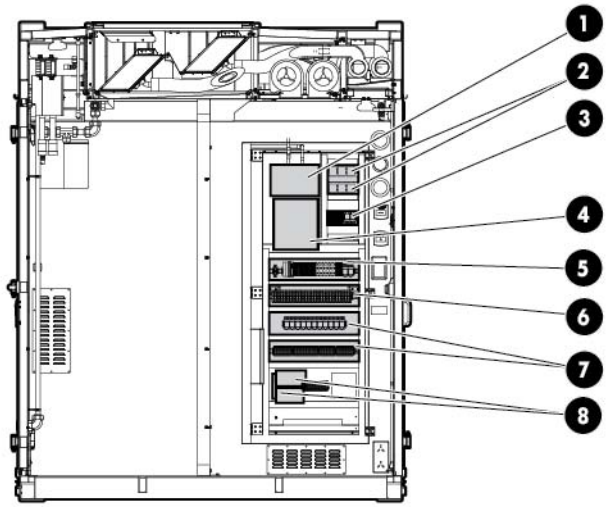
View shown



Item	Electrical safety label	Description
1	Input power	Lists the input power information

Item	Electrical safety label	Description
2	Panel schedule/circuit breaker table	Lists the layout and designation for all circuit breakers
3	Fuse type table	Lists all fuse types and sizes
4	Wire color code	Lists the 380-415 Y/200-240 V color codes: • Purple/Brown—Phase A/L1 • Purple/Orange—Phase B/L2 • Purple/Yellow—Phase 3/L3 • Purple/White—Neutral • Green and yellow—Equipment ground

Control cabinet component identification



Item	Component	Description
1	VESDA air sampling smoke detection unit	An early warning laser scan smoke detection unit
2	Leak detection relays	Interprets the electronic leak signals
3	Fire suppression	Data connection points for the fire suppression panel and input components
4	Fire alarm and suppression release control panel	• Controls all fire systems within the HP POD 20c, including the smoke detection system, fire suppression system, fire pulls, and so on • Includes a battery backup system that provides power to the fire system during a utility power loss
5	ECS relays and ECS modules	Relays for the ECS control, ECS communications, I/O connections, and terminal block connections
6	Fan control	Fan power supply controls and relays
7	EPO controller board and house panel fuses	Connections for the EPO system and fuses for other house panel components
8	Battery backup power supply	Provides 24V DC power to the PLC and ECS system

HP POD 20c racks

The HP POD 20c contains a total of ten IT racks.

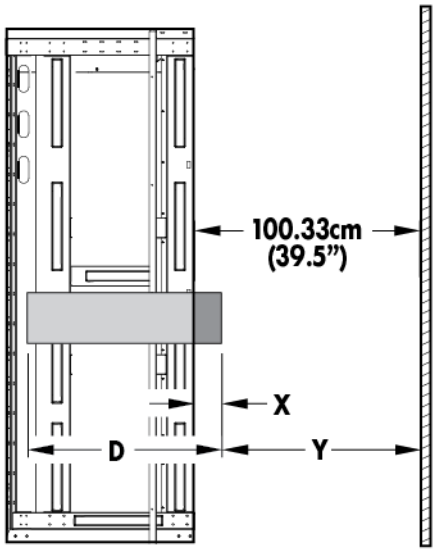
> **CAUTION:** If any racks contain empty RU space, use the HP POD 20c filler panels to maintain the efficiency of the HP POD 20c thermal system. Filler panels are available from HP in 10-pack quantities (part number AQ682A) and 100-pack quantities (part number AS993A).

For more information about racks and network cabling, see the *HP Performance Optimized Datacenter Networking Guide*.

Aisle clearances

Cold aisle clearance

The maximum protrusion of any installed IT component directly impacts the available cold aisle clearance for removal and replacement of other IT components. Maximum component depth must follow the clear aisle distance calculations. The following figure shows how to calculate this distance.

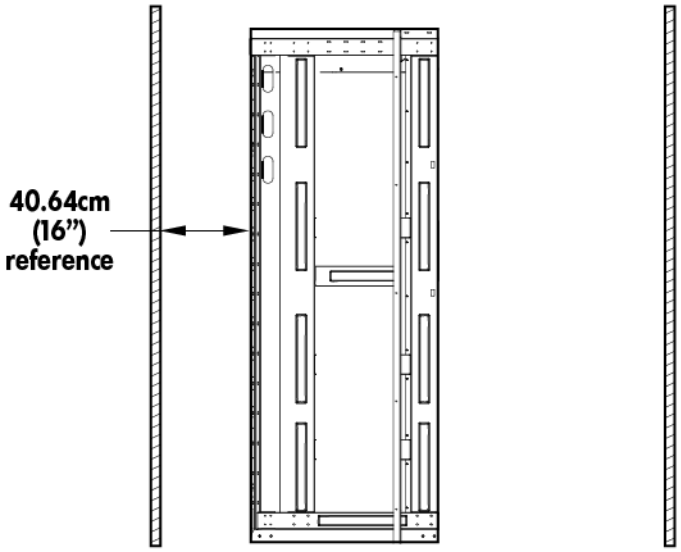


The maximum rack face-to-cold aisle wall distance is 39.5 inches. In the figure, **X** represents any protrusion into the cold aisle starting from the rack face of the installed IT component (for example, the bezel). **Y** represents cold aisle clearance. The cold aisle clearance dictates the maximum depth (**D**) of any installed IT component. To find the maximum cold aisle clearance, calculate **100.33 cm (39.5 in) - X = Y**.

> **IMPORTANT:** As the value for **X** increases, the value for **Y** decreases, which also decreases the maximum depth allowed for an installed component.

Hot aisle clearance

Hot aisle clearance is defined as the distance from the rear of the rack to the hot aisle wall. The reference distance of 2.54 cm (16 in) must be considered when selecting IT infrastructure that will populate into the hot aisle.



Replaceable components for China models

The replaceable components in the following table can be replaced by qualified facilities personnel.

Spare part number	Description
595107-001	SPS-FILTER SCREENS FRAME w/FILTER
595108-001	SPS-MAINT KIT FILTERS-AT979A
612980-001	SPS-BUS BAR 5 POLE 3M
612981-001	SPS-END CAP
612982-001	SPS-HOUSING COUPLER
612983-001	SPS-MOUNTING STUD M10
637129-001	SPS-TSAT 60
637136-001	SPS-SENSOR PRESSURE ABS 10 BAR
641859-001	SPS-FILTER REPLACEMENT VESDA
660819-001	SPS-CABLE WD-CS-2M

The replaceable components in the following table are electrical components that must be replaced by a certified electrician.

IMPORTANT: A licensed electrician must connect the power according to all local and national electrical codes, and must comply with manufacturer specifications.

Spare part number	Description
660784-001	SPS-Breaker 1SDA054578R1
660786-001	SPS-Breaker Shield 1SDA054691R2

Spare part number	Description
660787-001	SPS-Breaker 1SDA054870R1
660788-001	SPS-Fuse-Switch SV 9344.000
660789-001	SPS-Switch NH00 KTF-160
660794-001	SPS-Switch 1SAM150000R1005
660796-001	SPS-Terminal Cover 1SDA051415R0001
660802-001	SPS-Relay Assembly 62.32.8.230.0040
660803-001	SPS-Relay 1SVR630884R3300
660806-001	SPS-Relay Assembly 46.61.9.0240074
718586-001	SPS-LED LIGHT CO82
718588-001	SPS-HUMIDIFIER CHF03V2001

The replaceable component in the following table must be replaced by a licensed fire safety contractor.

IMPORTANT: These parts must be replaced by a licensed fire safety contractor according to all local and regional fire codes, and in compliance with manufacturer specifications.

Spare part number	Description
664746-001	SPS-DETECTOR SMOKE VESDA VLS 214

Overview

Installation considerations

CAUTION: All plumbing to and from the HP POD 20c must be completed by a licensed plumber. All wiring in and around the HP POD 20c must be completed by a licensed electrician. Failure to comply with these instructions can impact your warranty and/or result in equipment damage.

(Optional) Fire suppression system

CAUTION: The POD fire suppression system is manufacturer designed, engineered, and installed to comply with national standards. However, HP does not certify that the installed fire suppression system meets all local jurisdictional requirements. Compliance with local codes is your responsibility, and includes specific local requirements for initial and periodic inspections, certifications, and maintenance.
Any additional local requirements are not covered as part of the option price or basic installation and deployment services, unless specifically included in an executed Statement of Work.

WARNING: Fire suppression agents include a pre-discharge warning and evacuating system. In the event of a fire, all protected space must be evacuated as soon as possible.

IMPORTANT: The fire suppression abort button is located next to the ECS panel and can be pressed to interrupt the 30-second fire suppression agent release delay for an additional 30 seconds. This button interrupts the countdown, but does not reset the 30-second fire suppression agent release delay. The fire suppression agent release countdown will continue when the abort button is released until the time is exhausted and the fire suppression agent is released.

The fire suppression system contains conventional fire alarm control circuits and includes features required for single or dual-hazard suppression release applications, including a low-toxicity agent. In the event of fire suppression release, the suppression tanks must be refilled by a certified technician.

Removal and replacement procedures

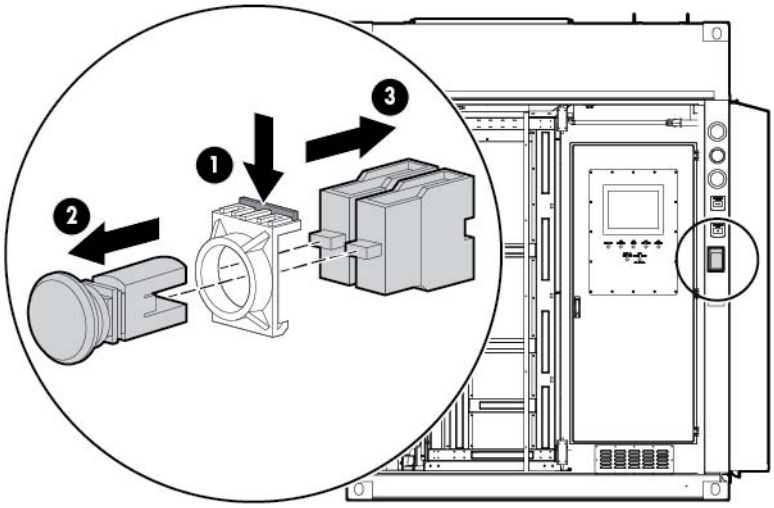
Buttons

EPO button

One EPO button is located on the POD interior near the main exit. A second EPO button is located on the POD exterior.

Removing the EPO button

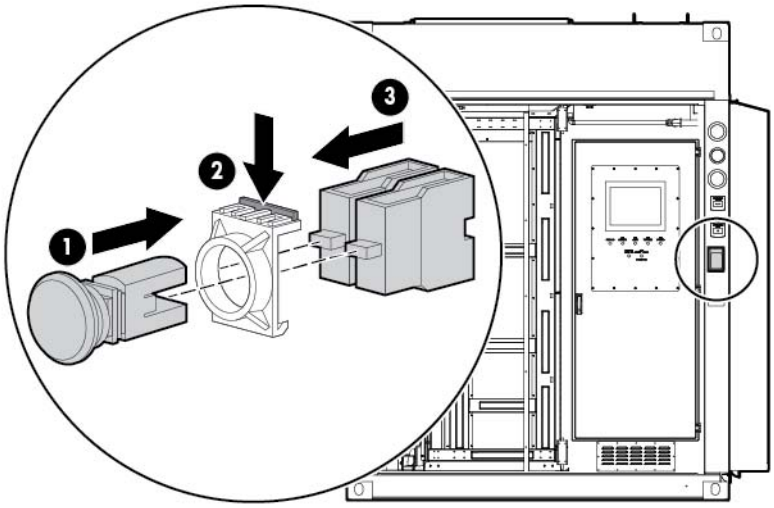
1. Grasp the bracket (1).
2. Remove the EPO button from the bracket (2).
3. Remove the contact modules from the bracket (3).
4. Disconnect the wires.



Replacing the EPO button

1. Reconnect the wires.
2. Insert the button head (1) into the bracket (2).

3. Insert the contact modules (3) into the bracket (2).



DIN rail components

Control relay module

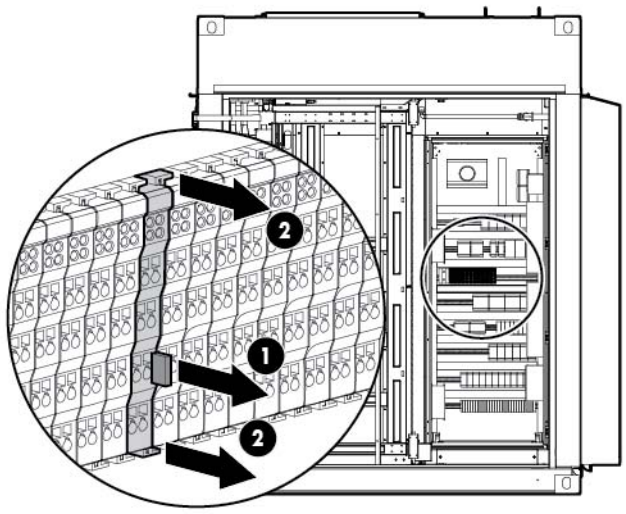
The HP POD 20c uses analog and digital control relays to communicate sensed parameters to the ECS for overall POD control and reporting features.

You need a screwdriver to remove and replace the control relay module.

Removing the control relay module

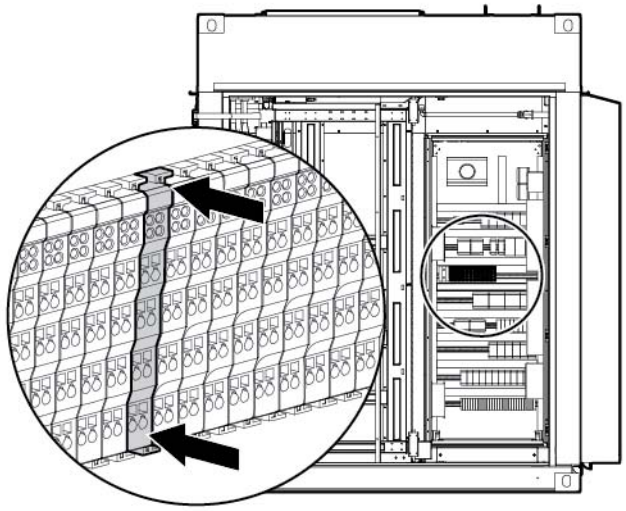
1. Label the wired connections or take a picture to remember which wires to reconnect to the control relay module.
2. Using a screwdriver, release the installed wiring.
3. Grasp the pull tab to disengage the control relay module from the DIN rail (1).

4. Remove the control relay module (2).



Replacing the control relay module

1. Align the control relay module with the mounting and power connections.
2. Slide the module until it clicks into the DIN rail.
3. Reconnect all wiring to the control relay module.



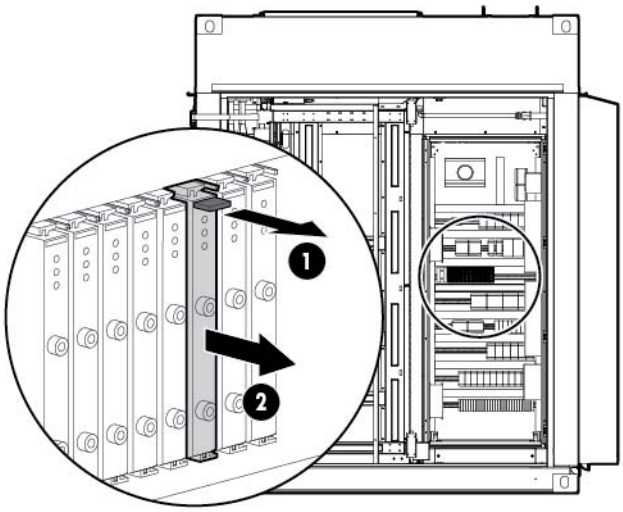
Differential pressure sensor

The HP POD 20c uses differential pressure sensing terminals located in the ECS cabinet to take pressure readings from the cold aisle, hot aisle, and cooling fan filters via sensing tubes. The terminal determines cold-to-hot aisle differential pressure and filter differential pressure for all three cooling zones.

You need a small wrench to remove and replace the differential pressure sensor.

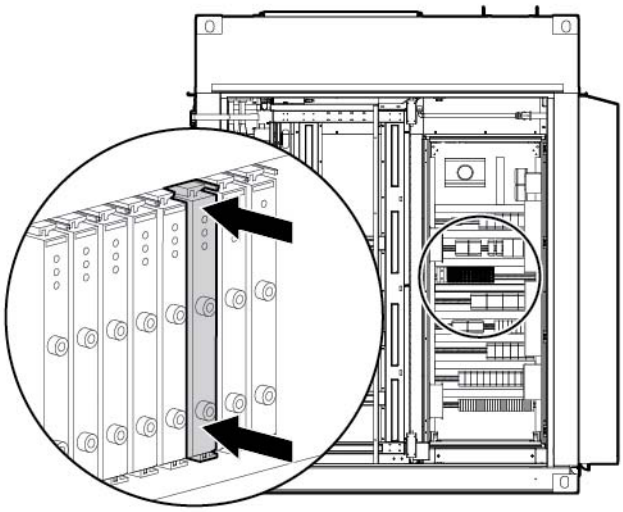
Removing the differential pressure sensor

1. Using a small wrench, loosen the tube retaining lock nut.
2. Label the hose connector tube or take a picture to remember which hose to reconnect to the I/O system later.
3. Remove the hoses.
4. Pull the release tab at the top of the sensor to release it (1), grasp the edges of the sensor, and then pull forward to remove it (2).



Replacing the differential pressure sensor

1. Slide the differential pressure sensor into the grooves until it clicks into place.
2. Refer to your notes on where to insert the hose to connect it to the I/O system.
3. Using a small wrench, tighten the retaining lock nut. Do not over-tighten it.
4. Reconnect the hose to the I/O system.



Door position devices

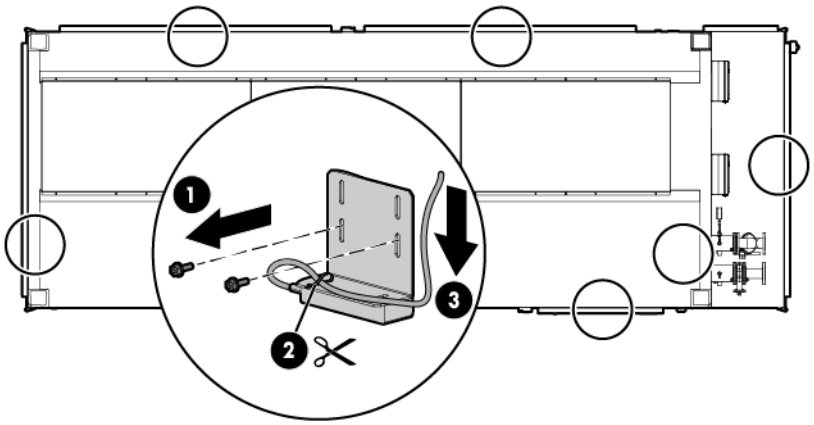
Magnetic contacts

Magnetic contacts are located on all doors and cabinets.

You need a screwdriver and scissors to remove and replace the magnetic contact.

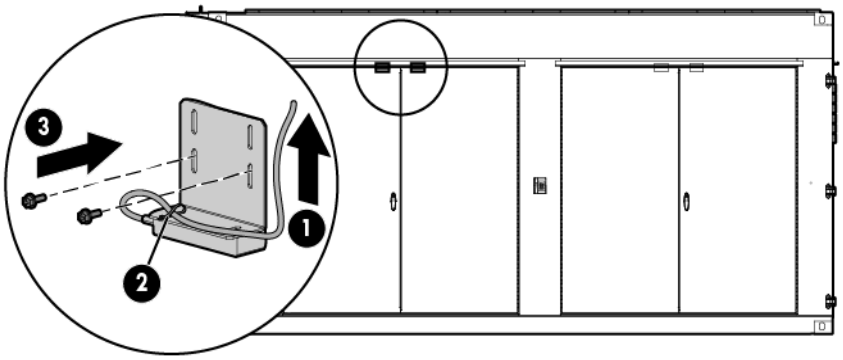
Removing the magnetic contacts

1. Remove the two screws that secure the upper magnet (1).
2. Cut the tie wrap (2) and loosen the nut on the POD structure that secures the wire.
3. Pull the wire all the way through to the point of entry or ECS panel (3).



Replacing the magnetic contacts

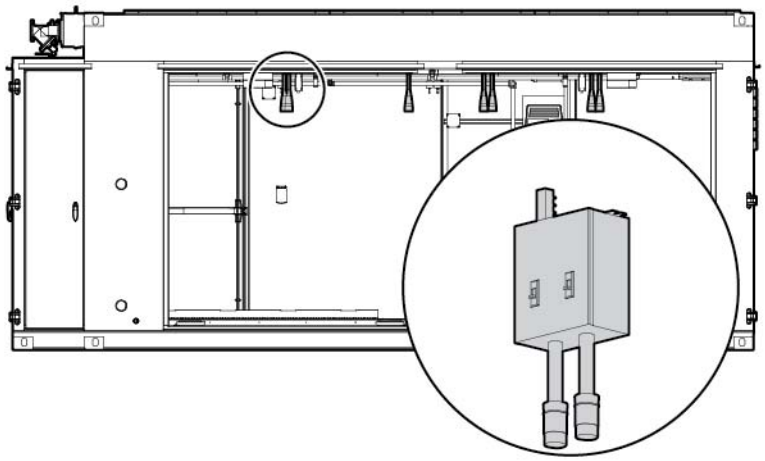
1. Feed the wire all the way through from the point of entry or ECS panel (1).
2. Tighten the nut on the POD structure that secures the wire, and then replace the tie wrap (2).
3. Secure the magnet to the bracket using two screws (3).



Electrical

Busway drop box

The internal electrical busways provide a location to connect each of the drop boxes, which then power the PDUs. Stagger the drop boxes on the electrical busways by connecting one drop box to busway #1 and connecting the next drop box to busway #2. A staggered configuration enables load balancing with the rack equipment and is necessary to ensure redundancy.



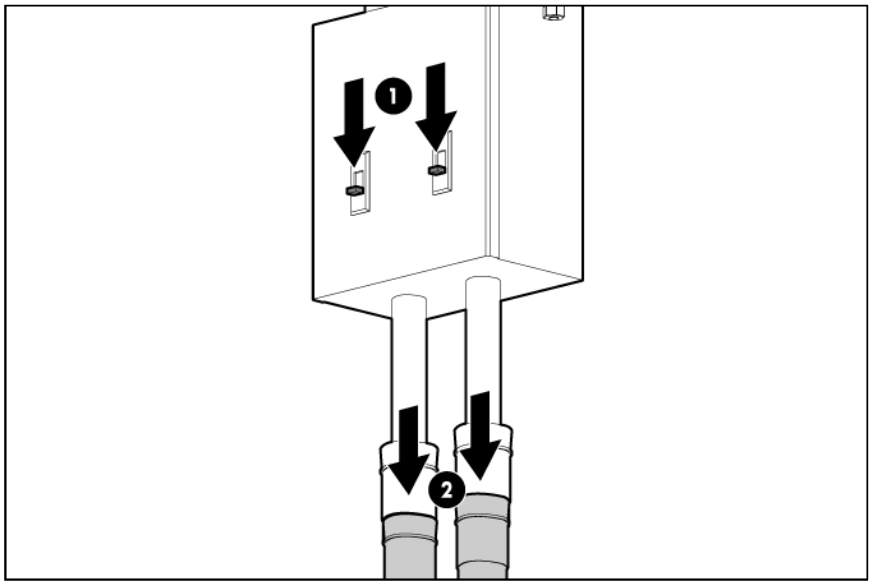
IMPORTANT: HP recommends that you shut down the associated IT equipment and de-energize the appropriate section of the power busway before attempting to remove or replace a busway drop box. The corresponding branch circuit breaker is labeled on the busway.

You need a socket wrench to remove and replace the busway drop box.

Removing the busway drop box

1. Turn the power off by opening both breakers on the busway drop box (1).

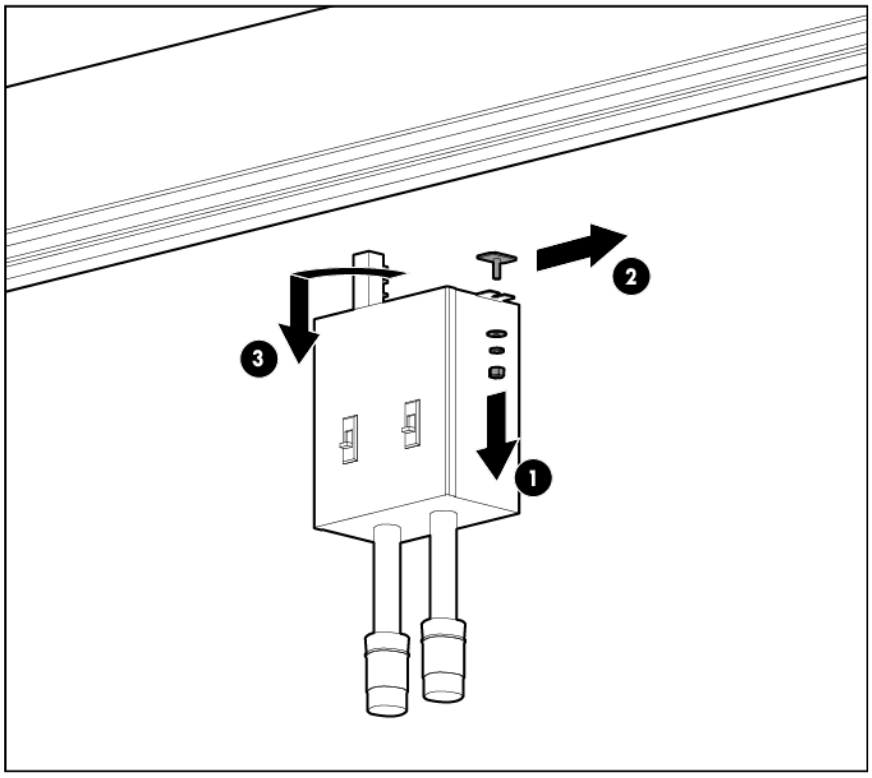
2. Disconnect the PDUs that are connected to the busway drop box (2).



3. Use a socket wrench to loosen and remove the bolt securing the busway drop box to the retaining hardware bracket (1).
4. Slide the hardware bracket to the right along the busway, completely disconnecting it from the busway drop box (2).

> ⚠ **WARNING:** Use caution when removing and replacing the busway drop box. The drop box weighs approximately 9 kg (20 lb).

5. Rotate the busway drop box 90° so that it is perpendicular to the electrical busway, and then remove the drop box from the electrical busway (3).



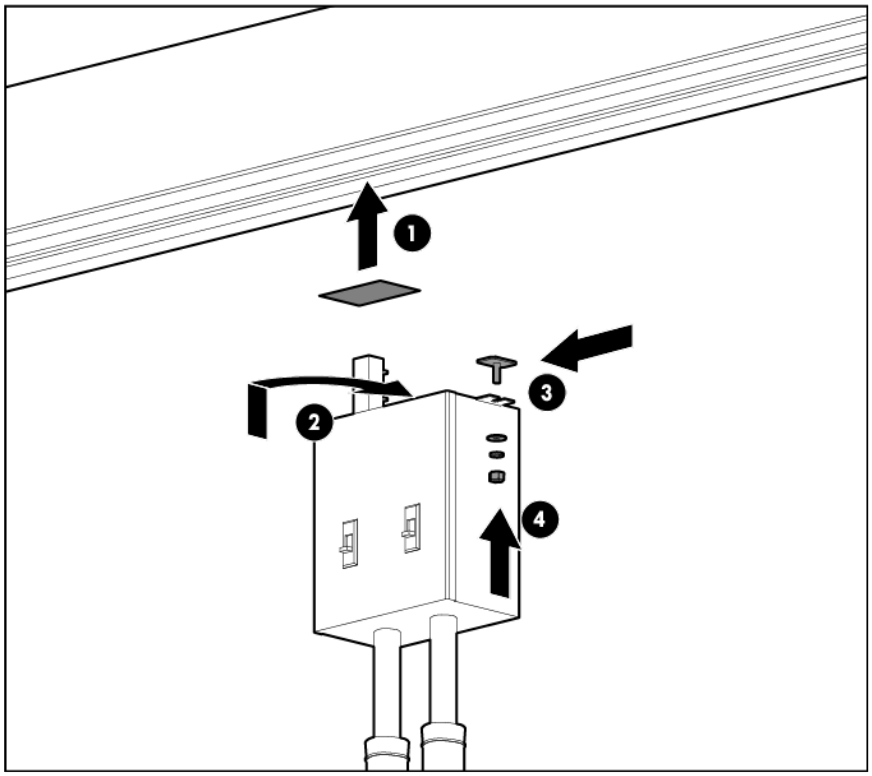
Replacing the busway drop box

> **WARNING:** Use caution when removing and replacing the busway drop box. The drop box weighs approximately 9 kg (20 lb).

1. Place the silver drop box bracket onto the electrical busway where you want to replace the busway drop box (1).
2. Note the required rotation indicated on the drop box, insert the drop box into the drop box bracket on the electrical busway, and then rotate the drop box 90° until it locks into place (2).

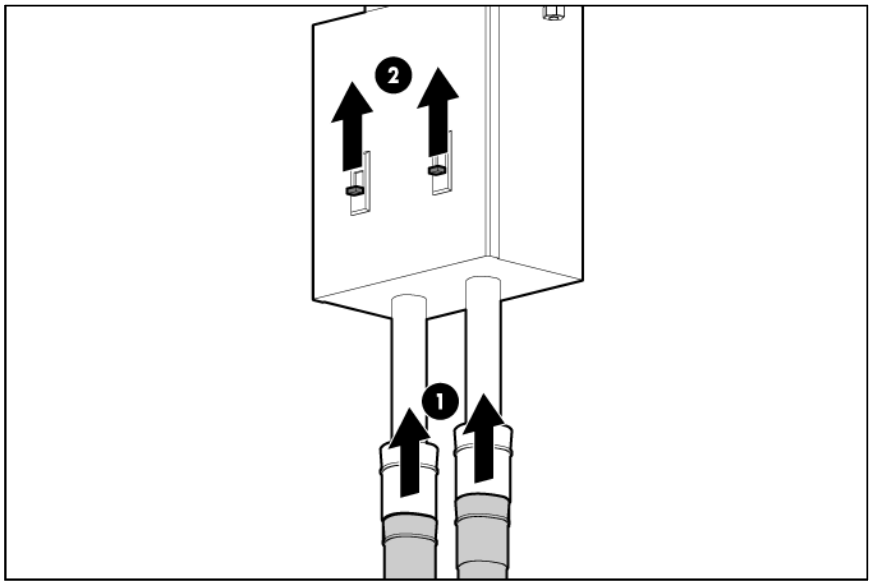
> **CAUTION:** To prevent damage to the drop box and ensure that the drop box engages properly, be sure that the drop box is completely flush to the busway. If a drop box is damaged during installation, do not attempt to re-engage or repair the drop box.

3. Slide the hardware bracket to the left along the busway until it connects to the drop box (3).
4. Secure the busway drop box to the retaining hardware bracket by using a socket wrench to insert and tighten a bolt (4).



5. Connect the PDUs to the busway drop box (1).

6. Turn the power on by closing both breakers on the busway drop box (2).



Fans

IT cooling fan

HP POD 20c fans operate at four speeds to maintain the cold-to-hot aisle differential pressure and hot aisle temperature setpoints that are programmed into the ECS.

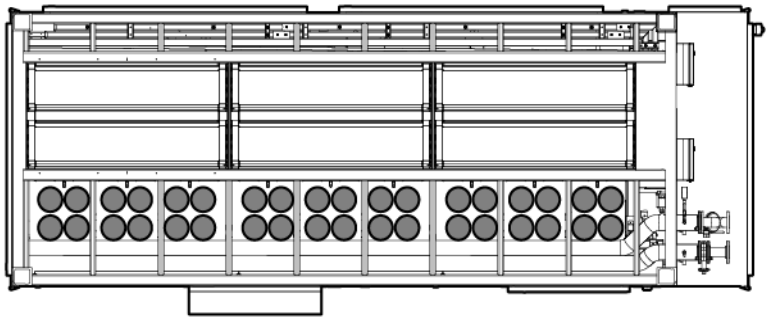
The fan speed adjusts to maintain the programmed setpoints. Do not manually adjust the fan speed.

CAUTION: Power must be removed from the fan power assembly before removing or replacing a fan or fan bank.

CAUTION: De-energize any additional working fans within the affected zone before replacing the fan. De-energizing working fans reduces the IT cooling airflow within the zone. Take this into consideration when deciding whether to continue operating IT equipment within the affected zone. HP recommends powering down all of the IT in the zone.

IMPORTANT: HP recommends leaving the fans in AUTO mode during normal operation.

The HP POD 20c has 3 banks of 4 fans, for a total of 12 fans per zone. The fans circulate cool air from the heat exchangers throughout the POD.



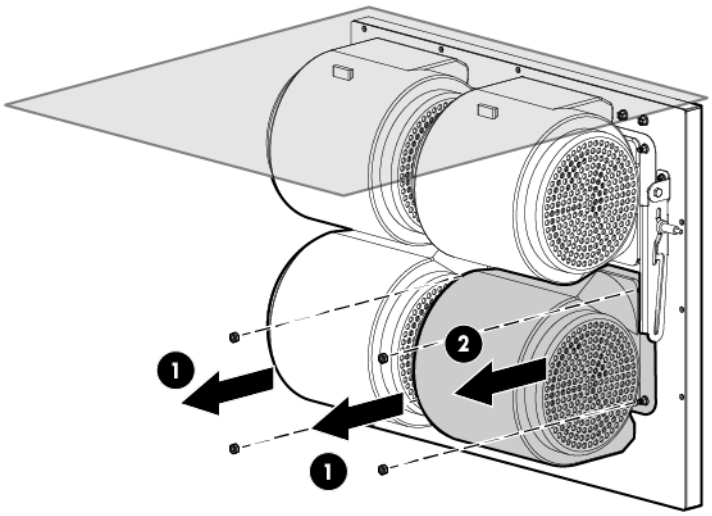
The three fan banks are located in the access hatches that are in the ceiling of the POD. The IT cooling fan has four screws and a power connection.

You need a screwdriver to remove and replace the IT cooling fan.

Removing the IT cooling fan

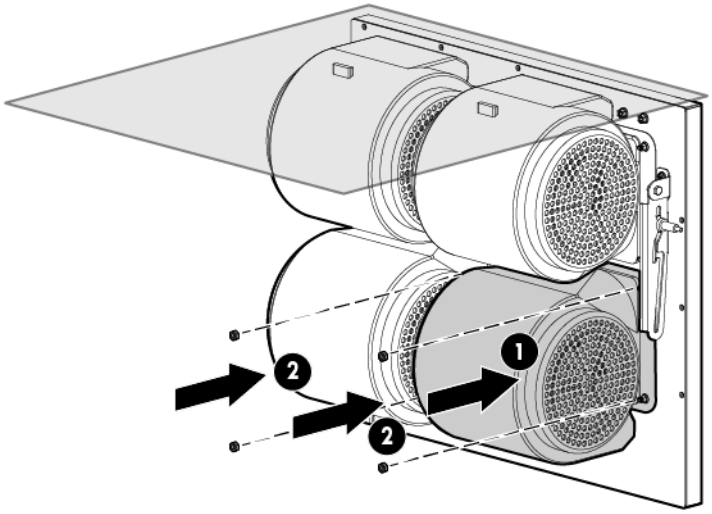
HP recommends leaving the fans in AUTO mode during normal operation.

1. From the ECS panel, take manual control of the fan speed in the affected zone.
2. Set the fan speed to 0 (zero).
3. Open the access hatch door.
4. Disconnect the power harness.
5. Remove the four screws (1)
6. Remove the IT cooling fan (2).



Replacing the IT cooling fan

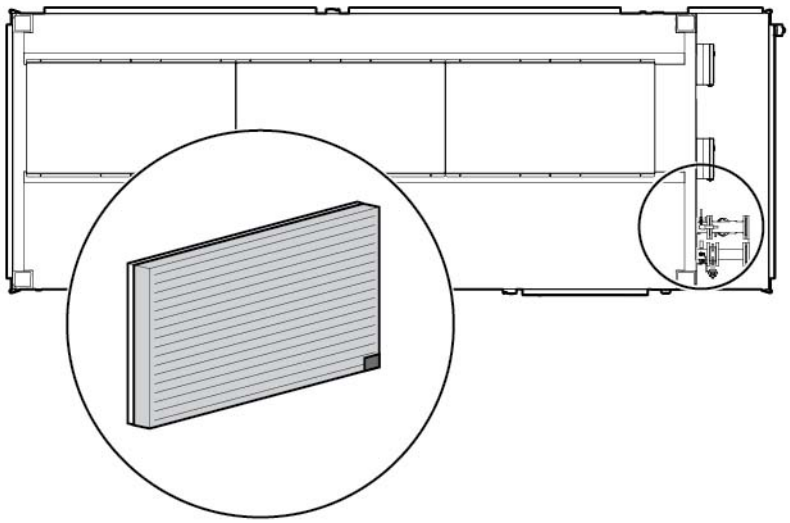
1. Position the IT cooling fan (1).
2. Replace the four screws (2).
3. Reconnect the power harness.
4. Close the access hatch door.
5. Return the fan bank to AUTO mode.



Ventilation fan

The ventilation fan is located between the ECS cabinet and the transformer cabinet. The purpose of the fan is to provide proper ventilation to the electrical components within the ECS and electrical cabinets.

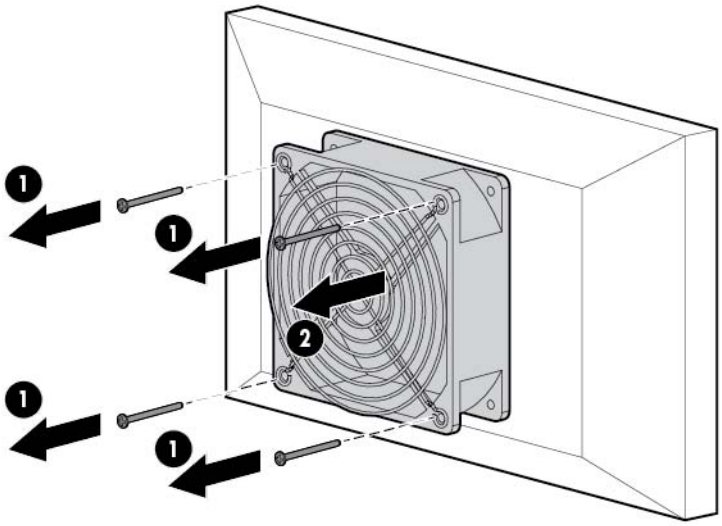
Rittal SK 3326



You need a screwdriver to remove and replace the ventilation fan.

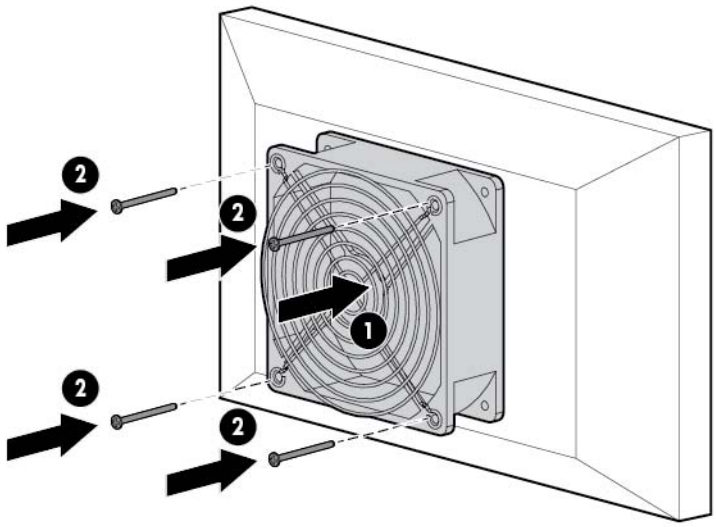
Removing the Rittal SK 3326 ventilation fan

1. Open the ECS cabinet door.
2. Label and disconnect the fan wires.
3. Remove the four screws (1).
4. Pull the fan module forward to remove it (2).



Replacing the Rittal SK 3326 ventilation fan

1. Insert the fan module into the screwless spring terminal (1).
2. Rotate the fan module clockwise until it is seated (2).



3. Reconnect the fan wires.
4. Insert the ventilation fan into the ventilation fan cut-out hole.
5. Close the ECS cabinet door.

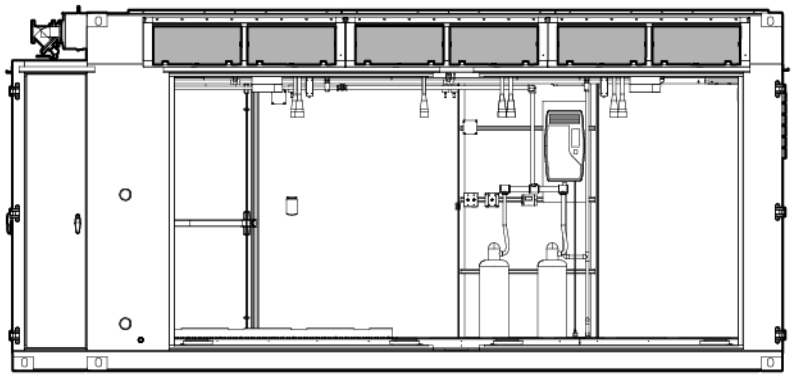
The Rittal SK 3326 ventilation fan has been discontinued, so if it malfunctions, you must order the Rittal SK 3243 ventilation fan.

To install the new fan, see the installation instructions included with the fan.

Filters

Heat exchanger air filters

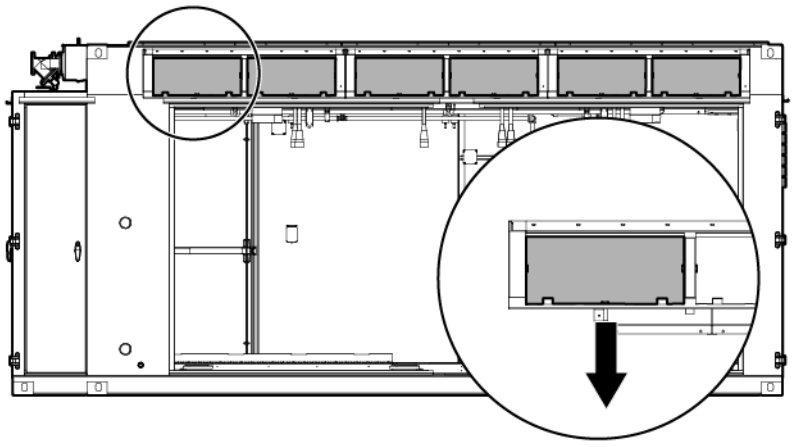
There are two heat exchanger air filters per cooling zone for a total of six filters.



You do not need any tools to remove or replace the heat exchanger air filter.

Removing the heat exchanger air filter

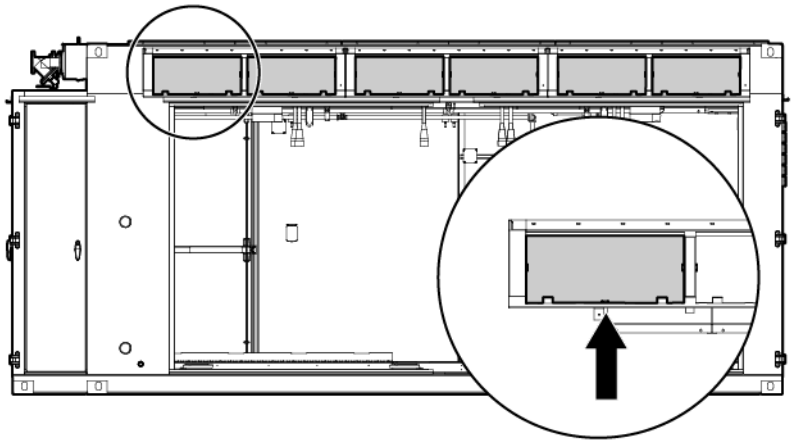
1. Pull the locking tabs away from the filter to release it.
2. Pull the filter down through the frame channels to remove it.



Replacing the heat exchanger air filter

1. Angle the filter to position the top corners in the frame channels, and then push the filter up to the top of the frame.

2. Push in the bottom corners of the filter until the locking tabs engage and the filter clicks into place.



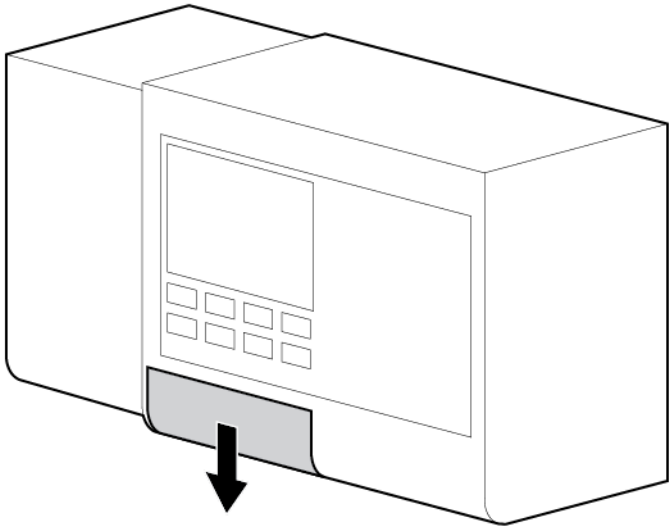
VESDA filter

The VESDA filter sensor notifies you through the ECS when a filter must be changed. HP recommends periodically inspecting and changing each VESDA filter. A VESDA filter can be replaced during normal HP POD 20c operation.

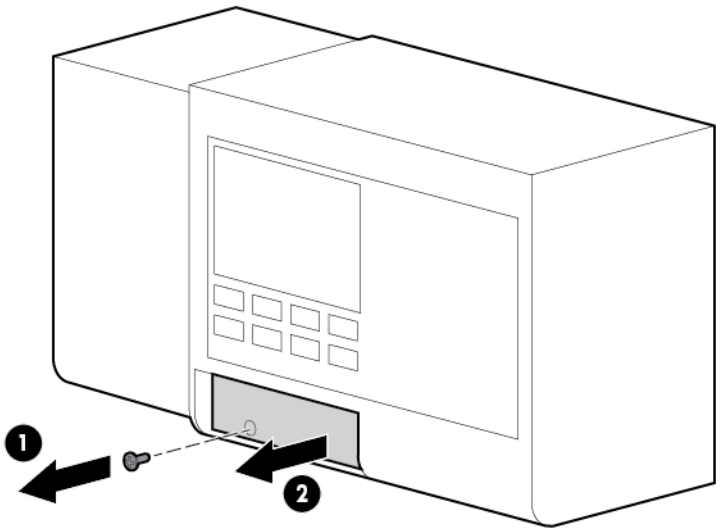
You need a Phillips-head screwdriver for installation.

Removing the VESDA filter

1. Remove the filter cover on the front of the VESDA unit.

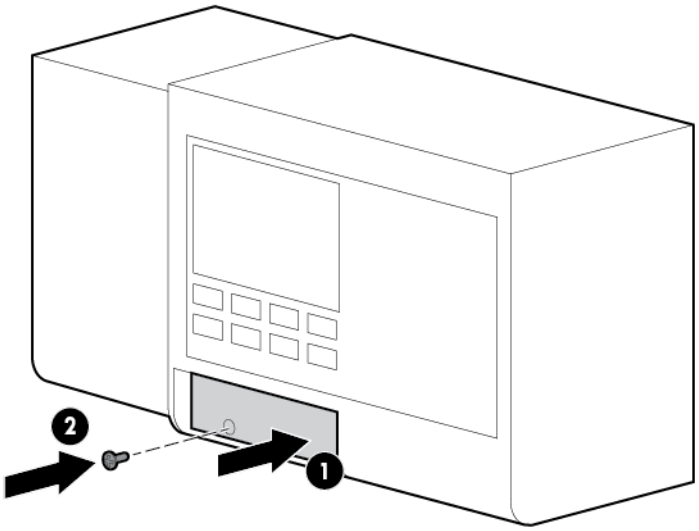


2. Remove the 10mm screw that secures the VESDA filter (1), and then remove the filter (2).



Replacing the VESDA filter

1. Insert the new VESDA filter (1), and then replace the 10mm screw that secures the filter (2).



2. Replace the VESDA filter cover.

Rittal SK 3326 ventilation fan filter

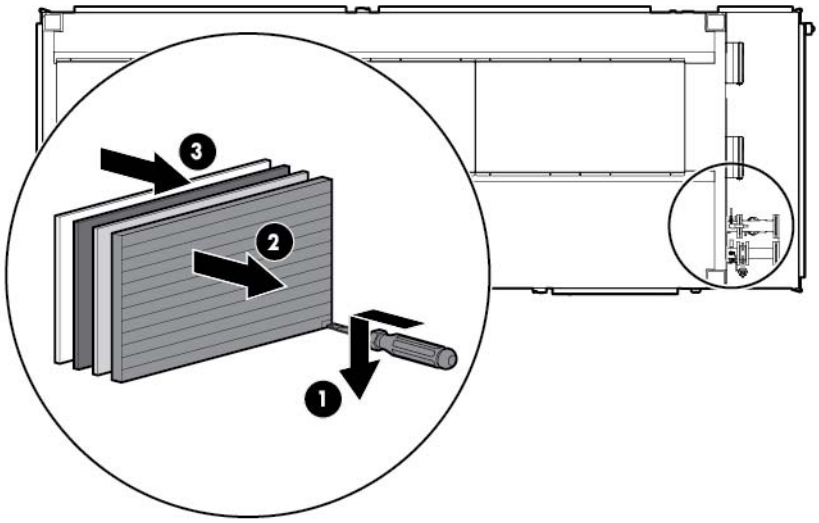
The ventilation fan filter is located behind the louvered grille.

IMPORTANT: Check the fan filter quarterly to be sure that it is clean.

You need a screwdriver for installation.

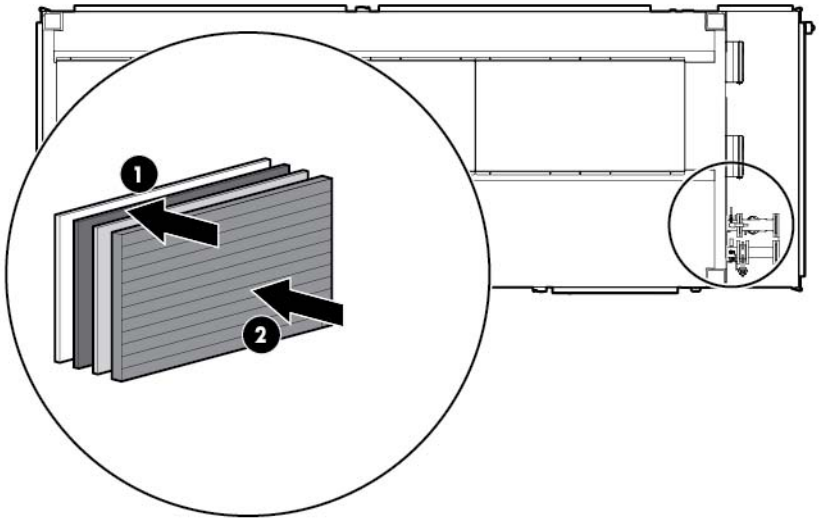
Removing the Rittal SK 3326 ventilation fan filter

1. Insert a screwdriver into the bottom right corner of the louvered grille and rotate it counterclockwise (1) to loosen the grille.
2. Grasp the louvered grille and pull forward to remove it (2).
3. Remove the old filter (3).



Replacing the Rittal SK 3326 ventilation fan filter

1. Insert the new filter (1).
2. Close the louvered grille (2).



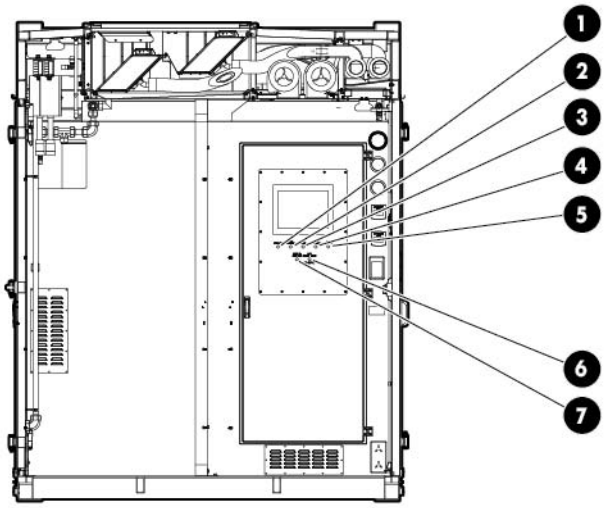
Indicators

ECS touchscreen and EPO indicators

The ECS touchscreen and EPO indicators are located on the door to the control panel.

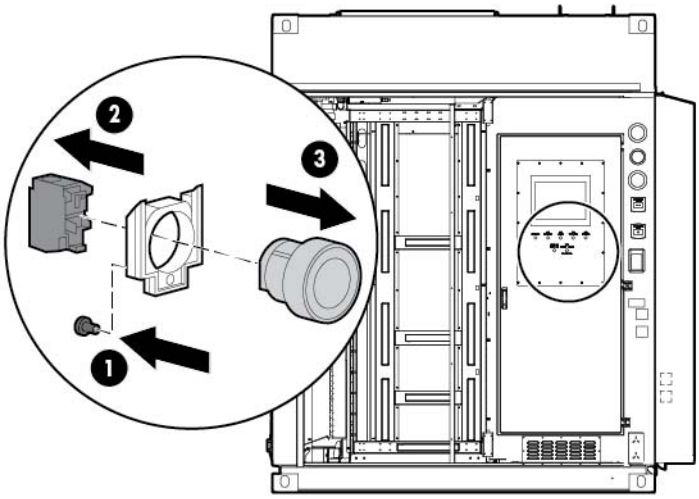
The touchscreen enables you to easily configure the environmental parameters, access data, and monitor environmental, life safety, and access control conditions within the HP POD 20c.

The EPO indicators provide EPO status. The EPO key control and EPO reset button enable you to adjust the EPO system mode.



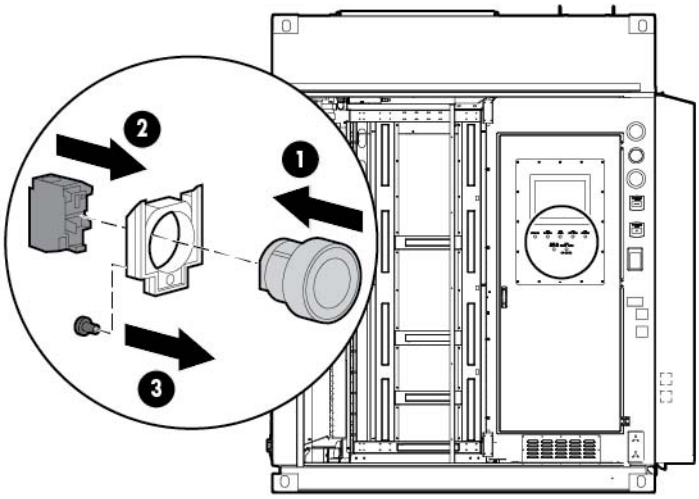
Item	Component	Indicator Color	Description
1	Power on indicator	White	Indicates the EPO power status
2	EPO shutdown indicator	Red	Indicates an EPO shutdown or alarm situation
3	EPO armed indicator	White	Indicates that the EPO system is armed and operational
4	EPO test mode indicator	Yellow	Indicates that the EPO system is operating in test mode or that an EPO cover is open
5	EPO bypassed indicator	Green	Indicates that the EPO shut down functionality is bypassed
6	EPO mode key control	—	Enables you to select the EPO mode.
7	EPO reset button	—	Resets the EPO system when pressed
8	EPO horn	—	Sounds when an EPO event occurs.

Removing the ECS EPO LED indicators



1. Remove the screw from the mounting base (1).
2. Remove the contact block from the mounting base (2).
3. Pull the ECS push button, selector switch, or LED light out of the mounting base (3).

Replacing the ECS EPO LED indicators

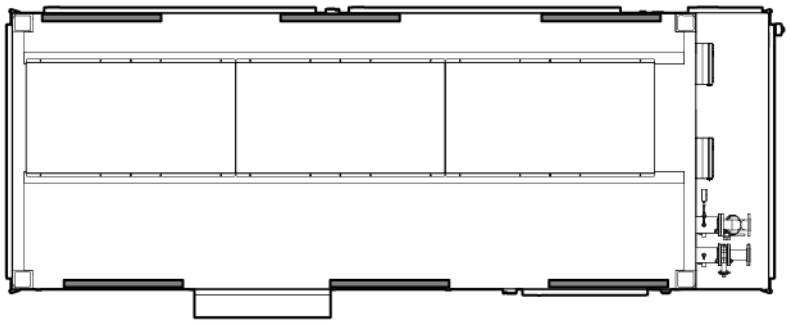


1. Insert the ECS push button, selector switch, or LED light into the mounting base (1).
2. Attach the contact block to the mounting base (2).
3. Attach the screw to the mounting base (3).

Lights

LED light

The HP POD 20c contains three LED lights in the cold aisle and three LED lights in the hot aisle.

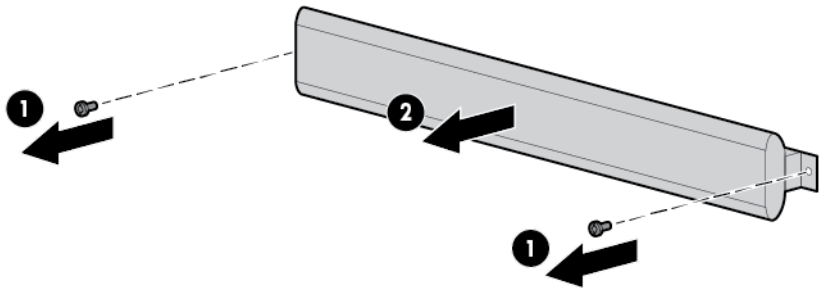


You need a screwdriver to remove and replace the LED light.

Removing the LED light

You need a screwdriver to remove and replace the LED light.

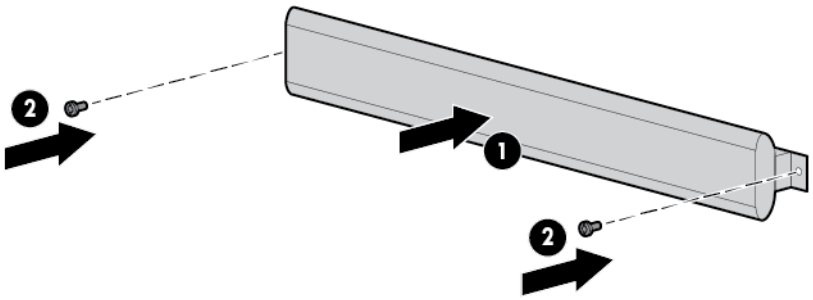
1. Disconnect power from the LED light.
2. Remove the screws (1).
3. Remove the LED light assembly (2).



Replacing the LED light

1. Place the LED light where you want to secure it (1).
2. Insert the screws (2).

3. Reconnect power to the LED light.



Sensors

Heat exchanger condensate drain pan sensors

The HP POD 20c - China model includes three heat exchanger condensate drain pan sensors. One drain pan sensor is located in the drain tray below each set of the heat exchangers.

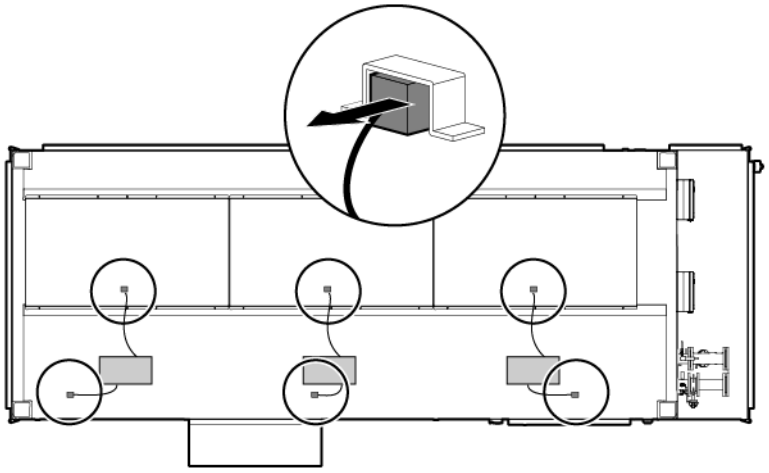
Three sensors are also located in the chilled water supply and return header drain pans, one in each of the three sections.

When the drain pan sensor probes become wet, the normally-open circuit is closed, allowing control voltage to return to the ECS panel and trigger the alarm.

You need a screwdriver to remove and replace the drain pan sensor.

Removing the drain pan sensor

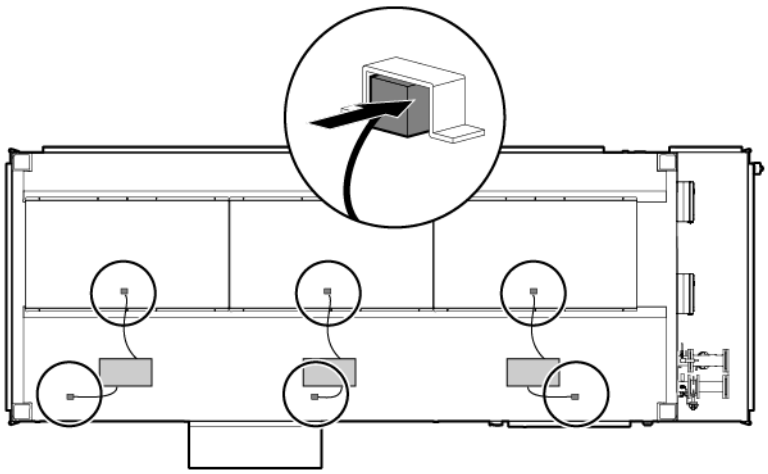
1. Open the center fan bank in the cold aisle of the affected sensor.
2. Fully extend the fan bank door.
3. Use a flashlight to locate the sensor.
4. Follow the sensor wire to the junction box. Disconnect the wire from the junction box terminal and note the wire location.



5. Route the wire from the junction box to the sensor location, and then remove the sensor.

Replacing the drain pan sensor

1. Position the sensor in the drain pan.



2. Route the wire to the junction box and reconnect the wire.
3. Close the center fan bank in the cold aisle of the affected sensor.

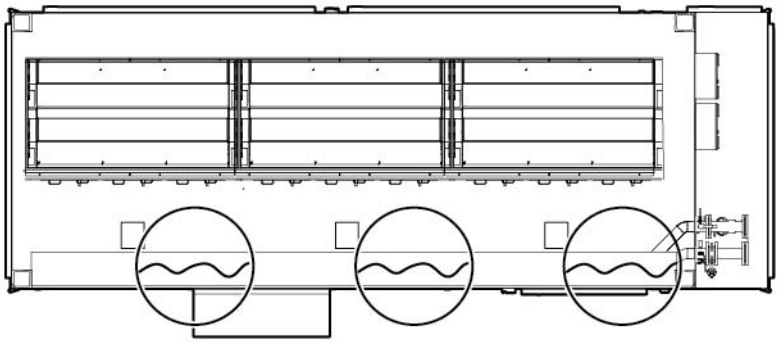
Chilled water supply and return header drain pan sensors

The HP POD 20c includes three heat exchanger condensate drains. One drain pan sensor is located in the drain tray below each set of heat exchangers.

Three sensors are also located in the chilled water supply and return header drain pans, one in each of the corresponding cooling zones.

Removing the chilled water supply and return header drain pan sensor

1. Follow the sensor wire to the associated satellite box. Disconnect the wire from the satellite box terminal and note the wire location.



2. Pull the wire through from the satellite box to the sensor location, and then remove the sensor.

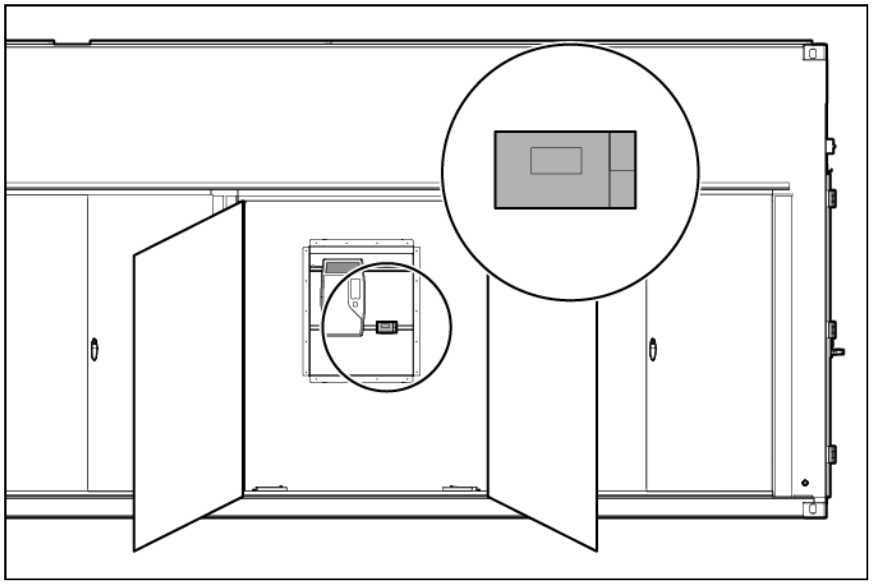
Replacing the chilled water supply and return header drain pan sensor

1. Position the sensor in the main header drain pan.

2. Route the wire to the associated zone satellite box.
3. Connect the sensor wire to the appropriate port on the satellite box terminal.

Humidistat

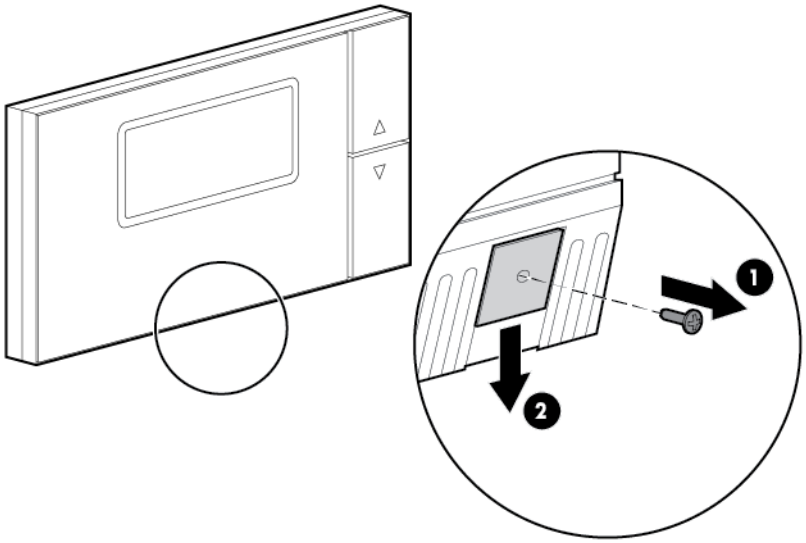
The humidistat is located in the cold aisle humidifier bump out.



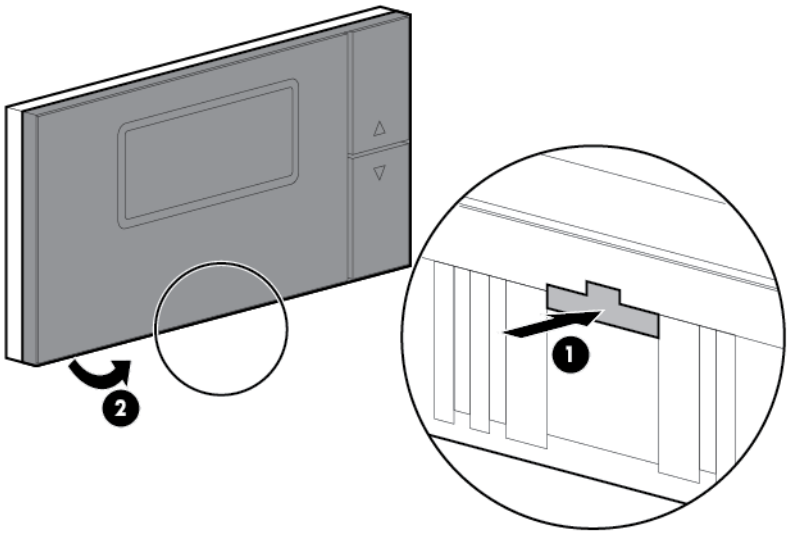
You need a Phillips-head screwdriver and a flathead screwdriver for installation.

Removing the humidistat

1. Press the power button on the outside of the humidifier to power down the humidifier.
2. Open and danger tag the associated circuit breaker in the ECS cabinet. The circuit breakers are identified on the panel schedule.
3. Detach the front panel of the humidistat from the mounting base:
   a. Remove the screw securing the tab in the opening (1), and then slide the tab to the open position (2).



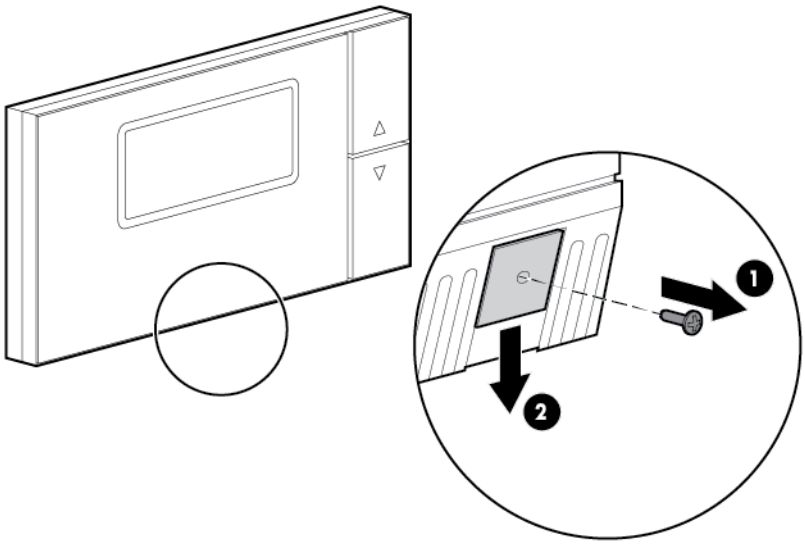
b. Use a flathead screwdriver to the press the release button (1), and then pull the front panel from the bottom to detach the panel (2). The two parts remain connected by a flat cable.



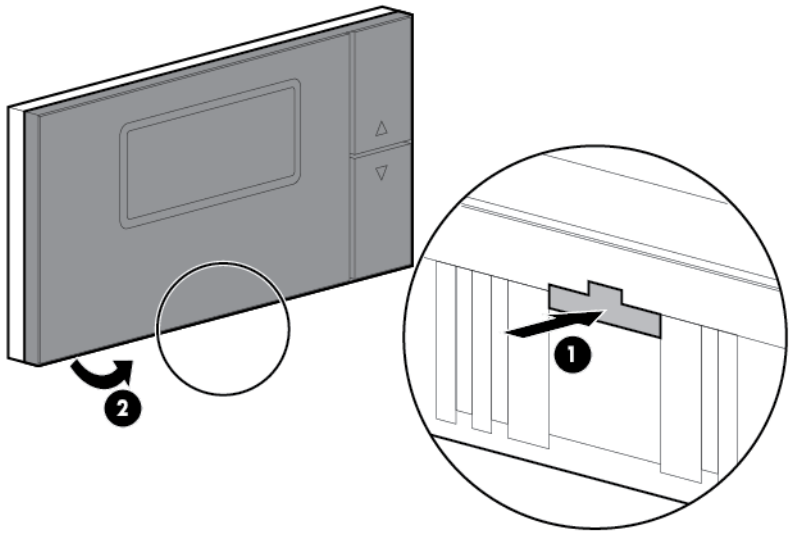
4. Squeeze the two terminal cover fins to remove the cables from the terminal block.
5. Remove the screws securing the mounting base to the wall.

Replacing the humidistat

1. Detach the front panel of the replacement humidistat from the mounting base.
   a. Remove the screw securing the tab in the opening (1), and then slide the tab to the open position (2).



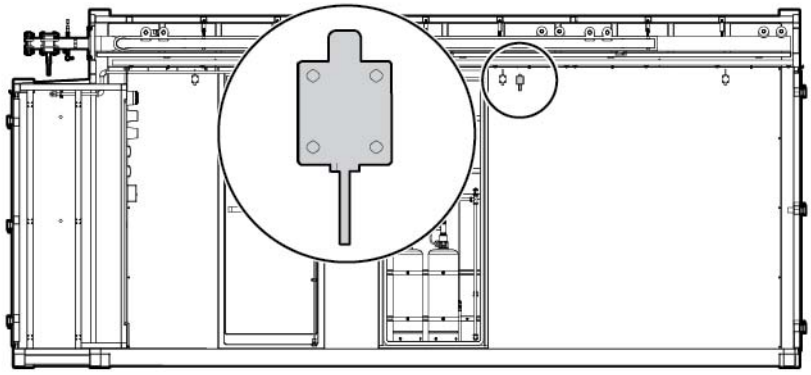
b. Use a flathead screwdriver to the press the release button (1), and then pull the front panel from the bottom to detach the panel (2). The two parts remain connected by a flat cable.



2. Secure the mounting base to the wall using the screws provided.
3. Squeeze the two terminal cover fins to remove the terminal covers.
4. Make the required connections by running the connection cables through the center hole in the bottom of the mounting base and connecting the cables to the terminal block.
5. Separate the connection and control cables from the relay cables.
6. Attach the front panel.
7. Close the associated circuit breaker in the ECS cabinet.
8. Press the power button on the outside of the humidifier to power up the humidifier.

Humidity sensor

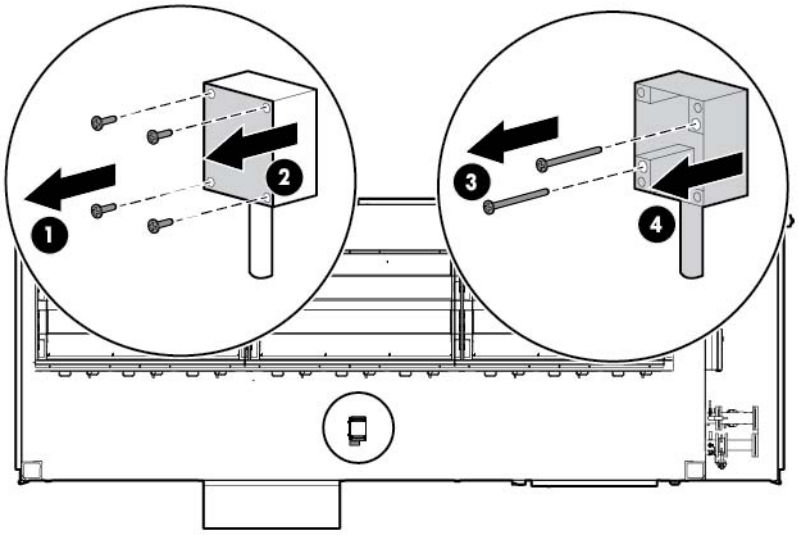
The HP POD 20c contains one humidity sensor. It is located in the cold aisle in cooling zone 2.



You need a screwdriver to remove and replace the humidity sensor.

Removing the humidity sensor

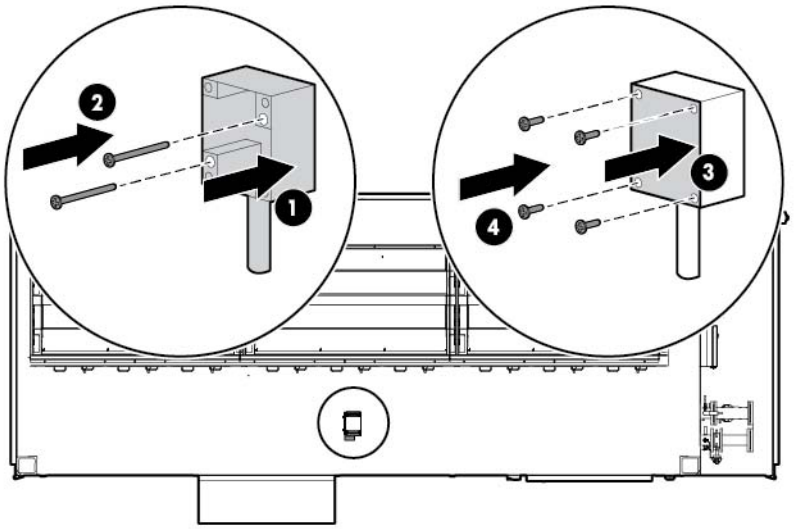
1. Remove the four screws that secure the sensor cover (1), and then remove the cover (2).
2. Remove the two self-tapping screws (3).
3. Identify the sensor wires.
4. Disconnect the sensor wires.
5. Remove the two retaining screws, and then remove the humidity sensor housing from the wall (4).



Replacing the humidity sensor

1. Re-attach the humidity sensor housing to the wall (1).
2. Replace the two self-tapping screws (2).
3. Reconnect the wires to the hot-aisle humidity sensor.
4. Replace the sensor cover (3).

5. Replace the four screws that secure the sensor cover (4).



Chilled water system temperature sensor

The HP POD 20c contains two chilled water header temperature sensors. One is located in the chilled water supply header and one is located in the chilled water return header.

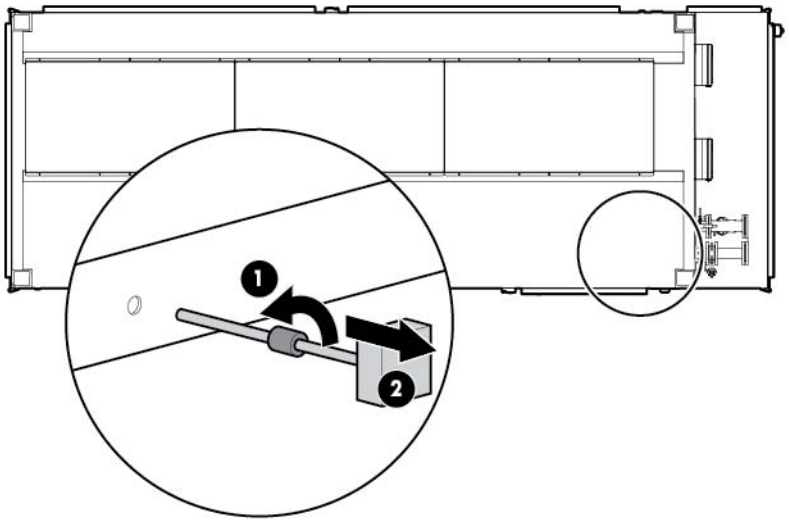
HP highly recommends replacing sensor internal components before replacing the entire sensor. For more information, see replacing the entire sensor.

You need a wrench and a screwdriver to remove and replace the sensor.

Removing temperature sensor from the chilled water system

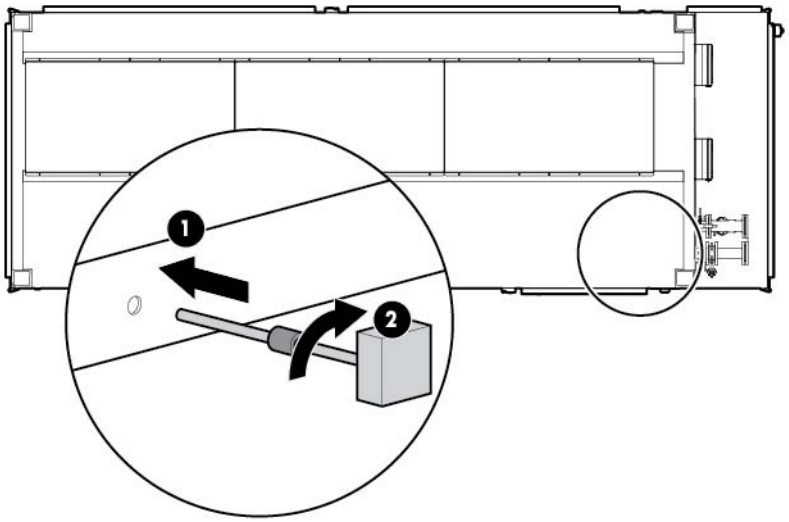
1. Identify the location of the sensor to be replaced, and then remove enough header insulation to uncover the sensor.
2. Remove the sensor cover.
3. Label and disconnect the sensor wiring.

4. Rotate the immersion sleeve counterclockwise (1), and then pull forward to remove the entire sensor from the chilled water header (2).



Replacing the temperature sensor in the chilled water system

1. Insert the new sensor probe into the chilled water header (1).
2. Rotate the immersion sleeve clockwise to secure the sensor onto the header (2).
3. Reconnect the wiring, replace the sensor cover, and replace the removed insulation.



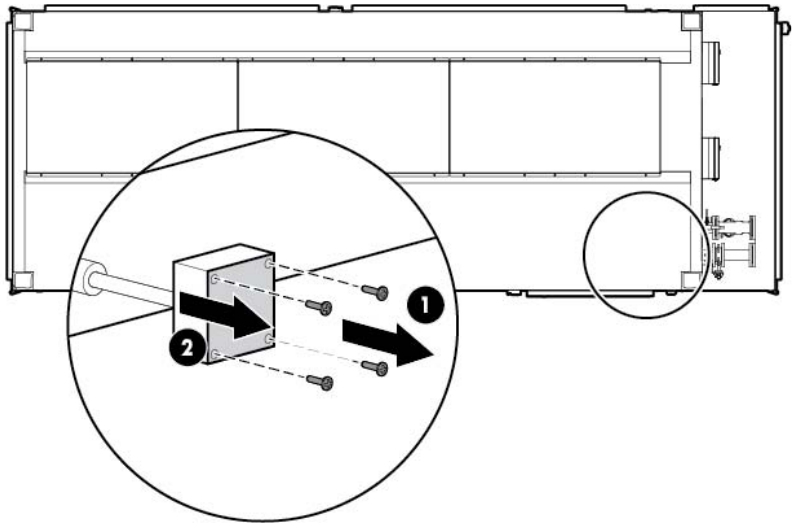
Chilled water temperature sensor internal components

The HP POD 20c contains two chilled water header temperature sensors. One is located in the chilled water supply header and one is located in the chilled water return header.

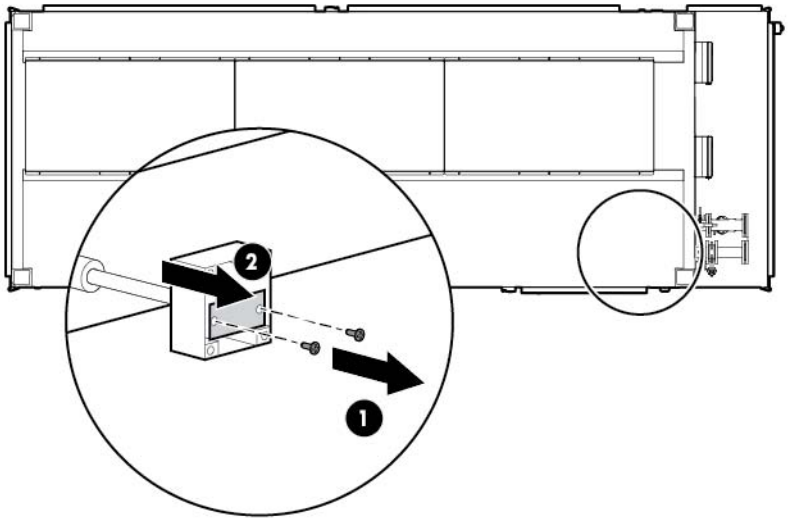
You need a screwdriver to remove and replace the chilled water temperature sensor internal components.

Removing the chilled water temperature sensor internal components

1. Remove the four screws from the sensor cover (1).
2. Remove the sensor cover (2).



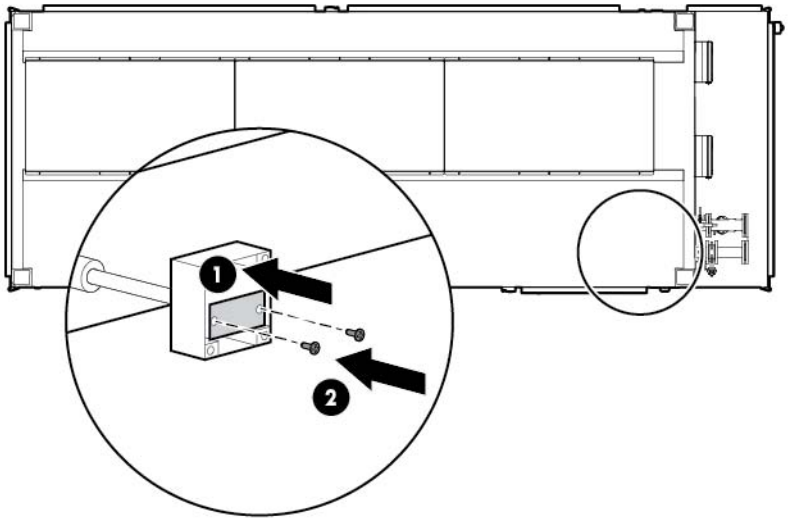
3. Label and disconnect the sensor wires.
4. Remove the two screws from the chilled water temperature sensor circuit board (1).
5. Remove the chilled water temperature sensor circuit board (2).



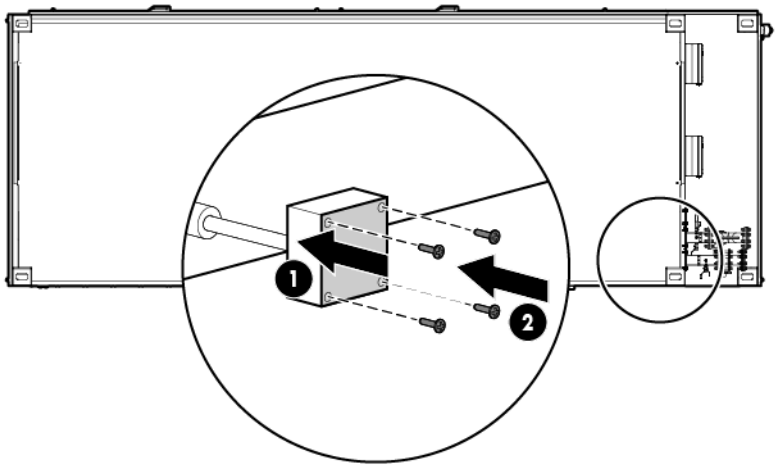
Replacing the chilled water temperature sensor internal components

1. Replace the chilled water temperature sensor circuit board (1).

2. Replace the two screws to secure the chilled water temperature sensor circuit board (2).



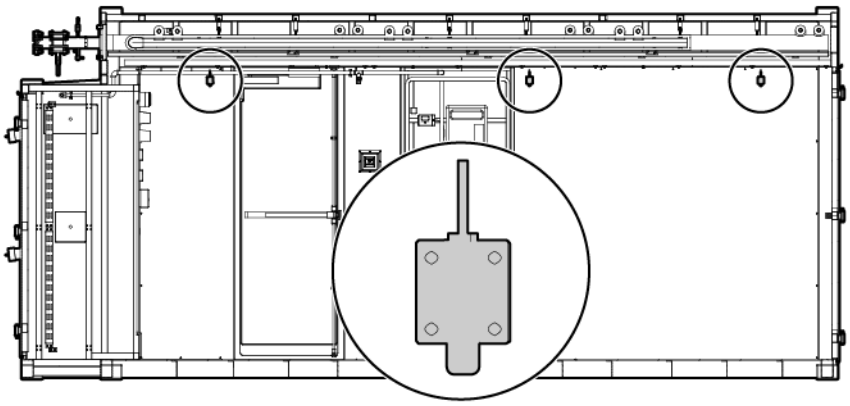
3. Reconnect the sensor wires.
4. Replace the four screws to secure the chilled water temperature sensor cover (2).



5. Replace the chilled water temperature sensor cover (1).

Temperature sensor (cold aisle)

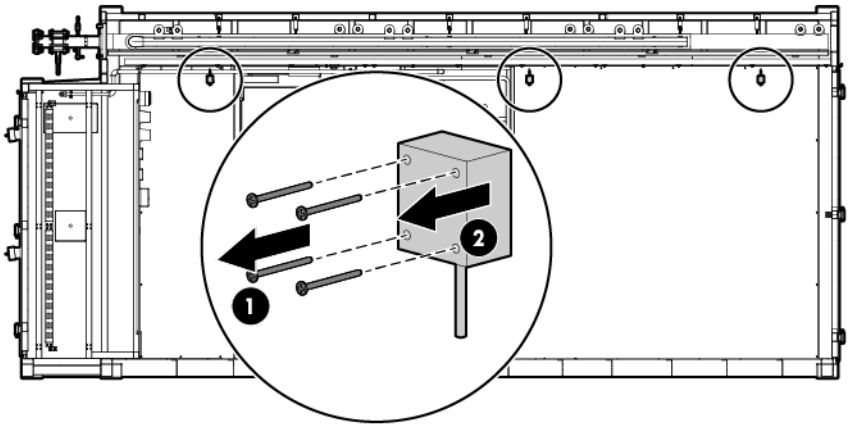
The HP POD 20c contains three temperature sensors in the cold aisle.



You need a screwdriver and scissors to remove and replace the cold aisle temperature sensor.

Removing the cold aisle temperature sensor

1. Remove the four screws that secure the cold aisle temperature sensor cover (1), and then remove the cover (2).

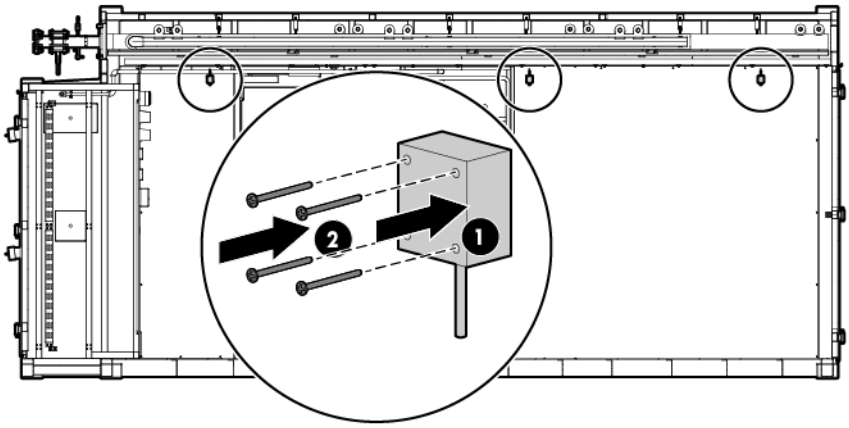


2. Label the cold aisle temperature sensor wires or take a picture to remember which wires to reconnect later.
3. Disconnect the wires.
4. Remove the two retaining screws, and then remove the cold-aisle temperature sensor housing from the wall.

Replacing the cold aisle temperature sensor

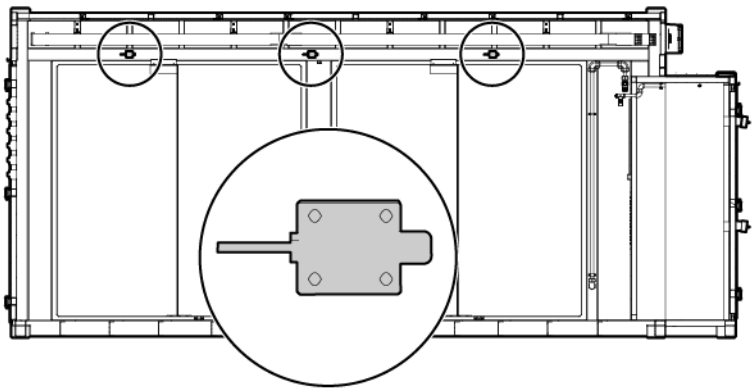
1. Reconnect the wires to the cold-aisle temperature sensor.
2. Reconnect the wires.
3. Re-attach the cold-aisle temperature sensor housing to the wall using the two retaining screws.

4. Replace the cold-aisle temperature sensor cover (1).
5. Replace the four screws that secure the cold aisle temperature sensor cover (2).



Temperature sensors (hot aisle)

The HP POD 20c contains three temperature sensors in the hot-aisle.

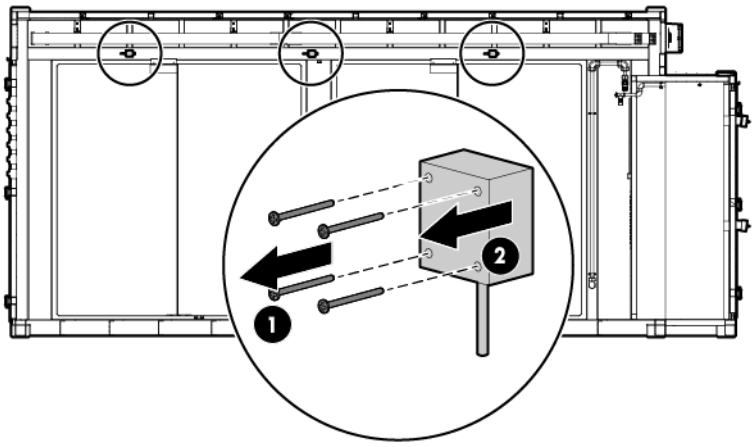


You need a screwdriver to remove and replace the hot aisle temperature sensors.

Removing the hot aisle temperature sensor

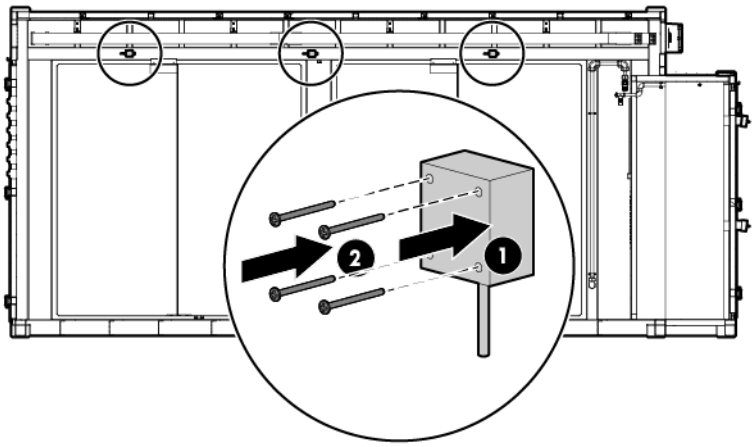
1. Remove the four screws (1) that secure the hot-aisle temperature sensor cover, and then remove the cover (2).
2. Label the hot-aisle temperature sensor wires or take a picture to remember which wires to reconnect later.
3. Disconnect the wires.

4. Remove the two retaining screws, and then remove the hot-aisle temperature sensor housing from the wall.



Replacing the hot aisle temperature sensor

1. Reconnect the wires to the hot aisle temperature sensor.
2. Reconnect the wires.
3. Re-attach the hot-aisle temperature sensor housing to the wall using the two retaining screws.
4. Replace the hot-aisle temperature sensor cover (1).
5. Replace the four screws that secure the hot-aisle temperature sensor cover (2).



Fluid system components

Chilled water supply and return header pressure sensors

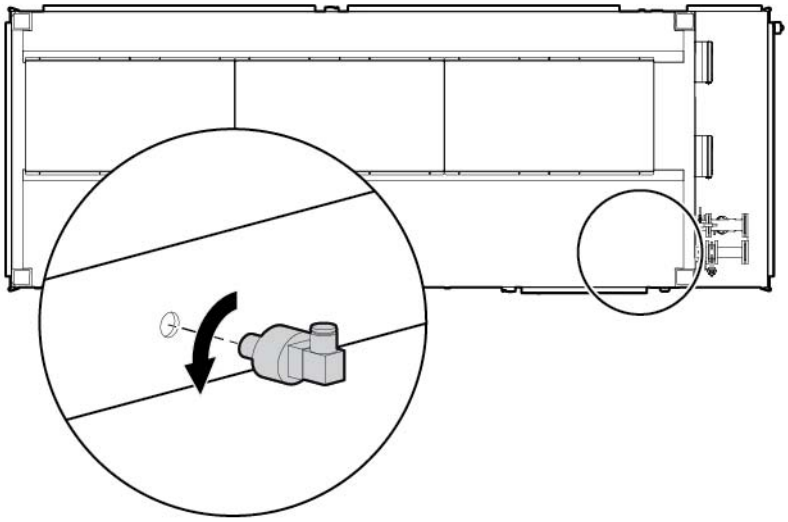
The HP POD 20c contains two chilled water pressure sensors. One is located in the chilled water supply header and one is located in the return header.

The chilled water supply and return header pressure sensors are located in the cold aisle where the headers penetrate the HP POD 20c.

You need a wrench to remove and replace the pressure sensors.

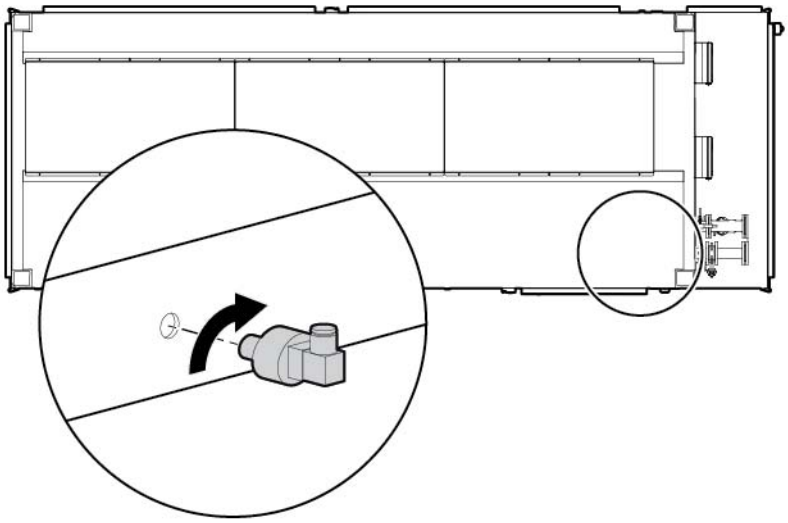
Removing the chilled water supply and return header pressure sensor

1. Observe the sensor alignment direction.
2. Disconnect the sensor wiring.
3. Using a wrench, disconnect the sensor from the tubing connection by rotating the nut counterclockwise.
4. Remove the sensor from the water piping.



Replacing the chilled water supply and return header pressure sensor

1. Position the sensor as it was prior to removal.
2. Connect the sensor to the sensing tube.
3. Using a wrench, rotate the sensor retaining nut clockwise to tighten it.
4. Reconnect the sensor wiring.

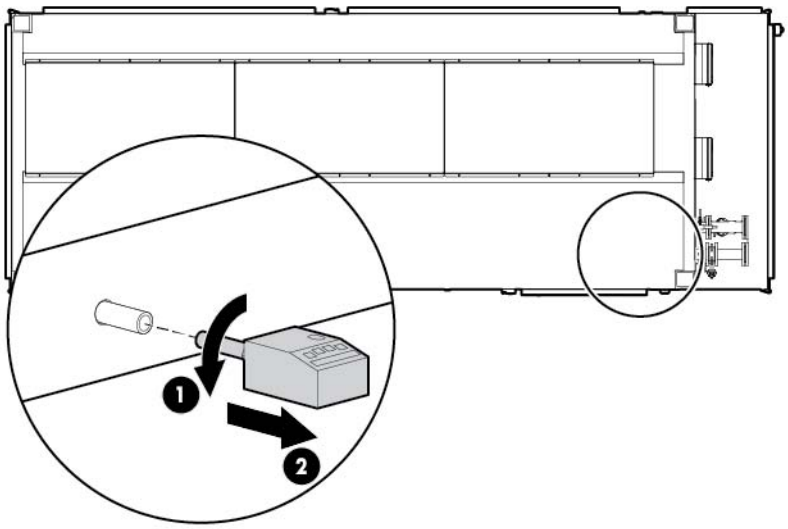


Chilled water flow sensor

You need a wrench to remove and replace the chilled water flow sensor.

Removing the chilled water flow sensor

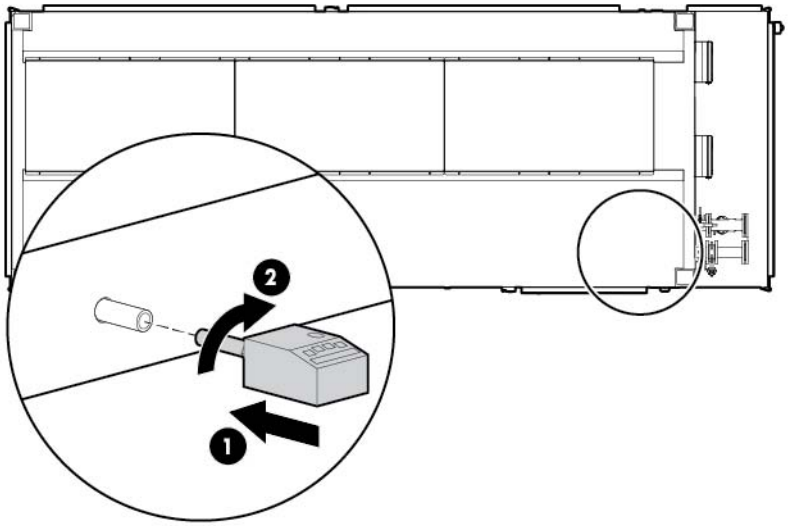
1. Label the wired connections or take a picture to remember which wires to reconnect to the chilled water flow sensor.
2. Disconnect the wires from the back of the sensor.
3. Using a wrench, rotate the sensor locking gland counter-clockwise (1).
4. Pull forward to remove the sensor from the water piping (2).



Replacing the chilled water flow sensor

1. Reference your notes on where to reconnect the wires to the chilled water flow sensor.
2. Reconnect the sensor wiring.
3. Insert the sensor into the water piping (1).

4. Using a wrench, rotate the sensor locking gland clockwise to tighten it (2).



Chilled water system temperature sensor

The HP POD 20c contains two chilled water header temperature sensors. One is located in the chilled water supply header and one is located in the chilled water return header.

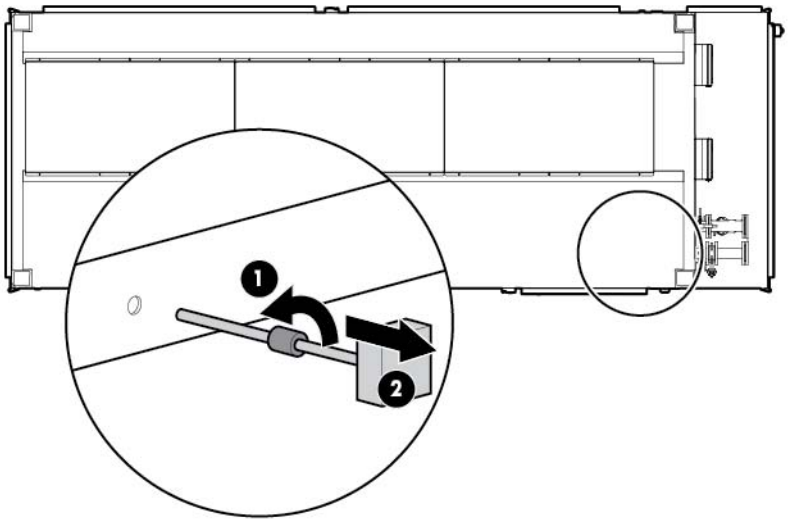
HP highly recommends replacing sensor internal components before replacing the entire sensor. For more information, see replacing the entire sensor.

You need a wrench and a screwdriver to remove and replace the sensor.

Removing temperature sensor from the chilled water system

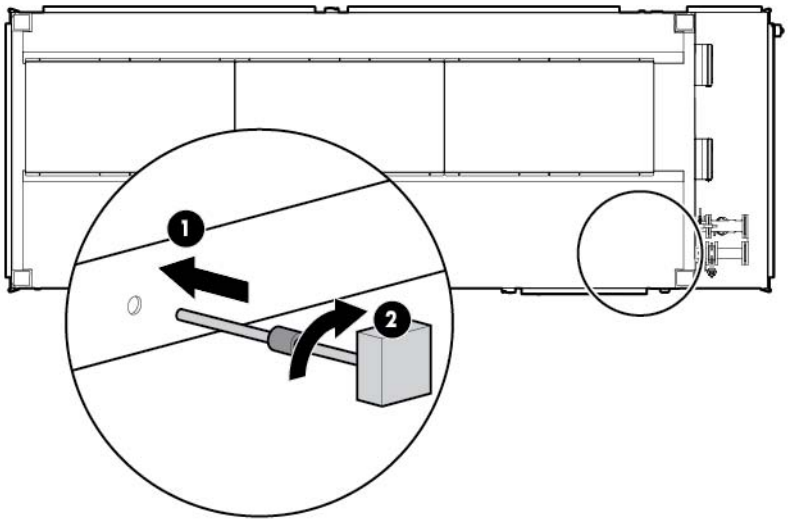
1. Identify the location of the sensor to be replaced, and then remove enough header insulation to uncover the sensor.
2. Remove the sensor cover.
3. Label and disconnect the sensor wiring.

4. Rotate the immersion sleeve counterclockwise (1), and then pull forward to remove the entire sensor from the chilled water header (2).



Replacing the temperature sensor in the chilled water system

1. Insert the new sensor probe into the chilled water header (1).
2. Rotate the immersion sleeve clockwise to secure the sensor onto the header (2).
3. Reconnect the wiring, replace the sensor cover, and replace the removed insulation.



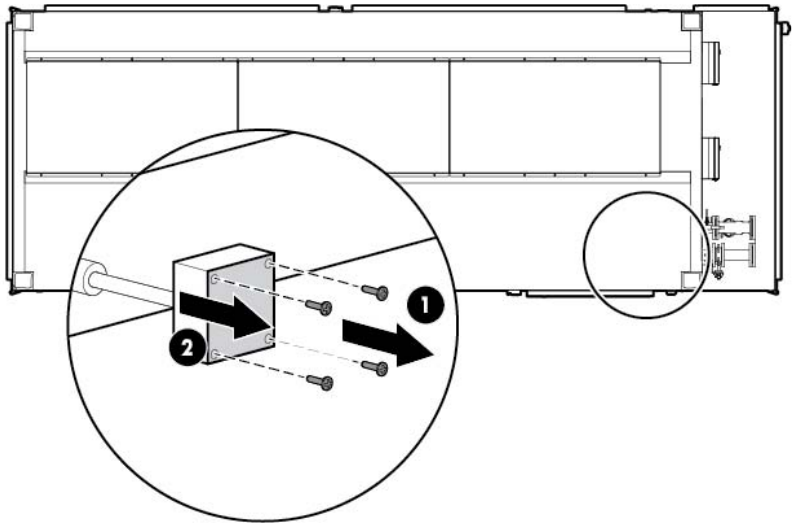
Chilled water temperature sensor internal components

The HP POD 20c contains two chilled water header temperature sensors. One is located in the chilled water supply header and one is located in the chilled water return header.

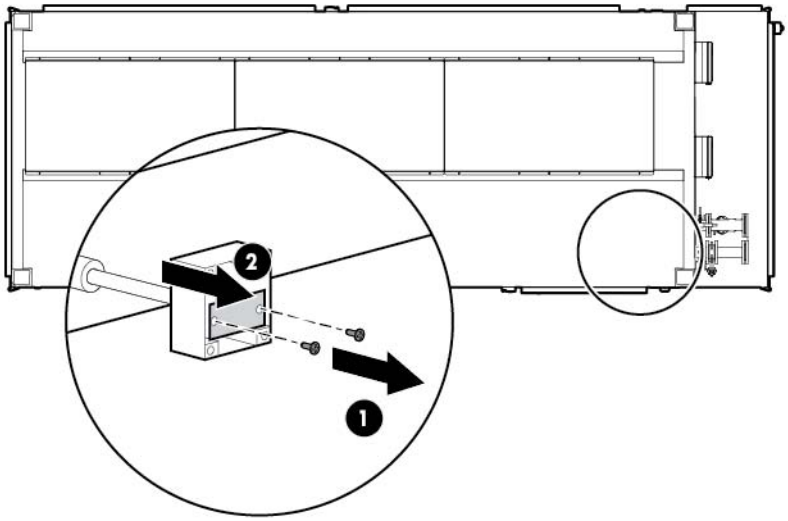
You need a screwdriver to remove and replace the chilled water temperature sensor internal components.

Removing the chilled water temperature sensor internal components

1. Remove the four screws from the sensor cover (1).
2. Remove the sensor cover (2).



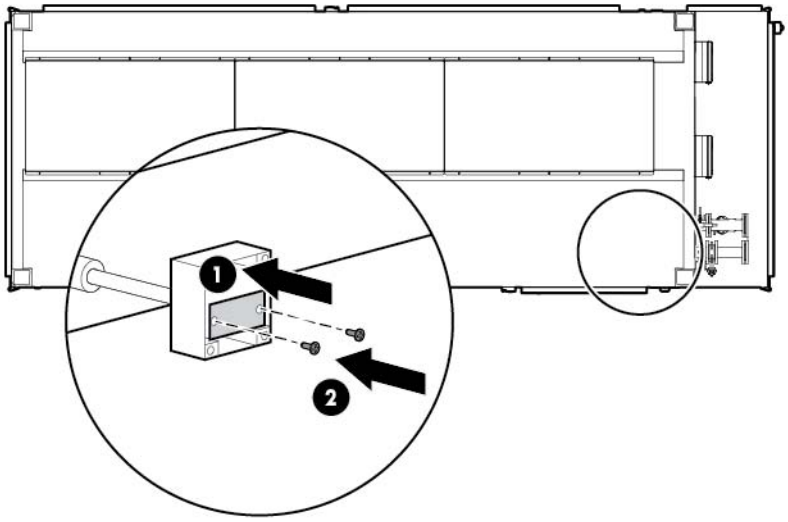
3. Label and disconnect the sensor wires.
4. Remove the two screws from the chilled water temperature sensor circuit board (1).
5. Remove the chilled water temperature sensor circuit board (2).



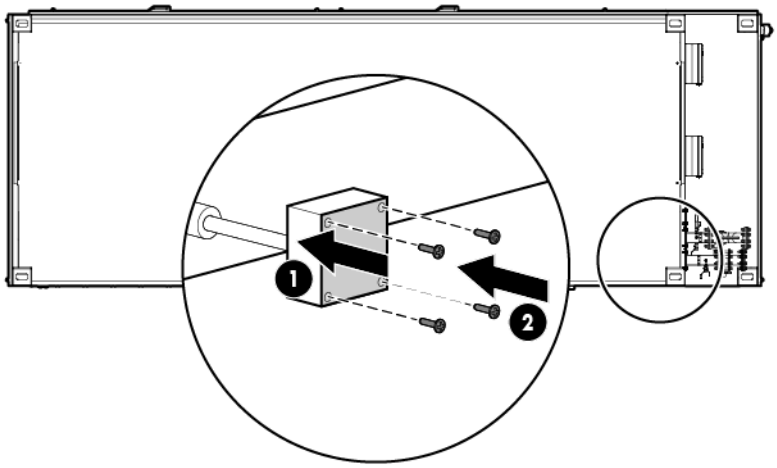
Replacing the chilled water temperature sensor internal components

1. Replace the chilled water temperature sensor circuit board (1).

2. Replace the two screws to secure the chilled water temperature sensor circuit board (2).



3. Reconnect the sensor wires.
4. Replace the four screws to secure the chilled water temperature sensor cover (2).



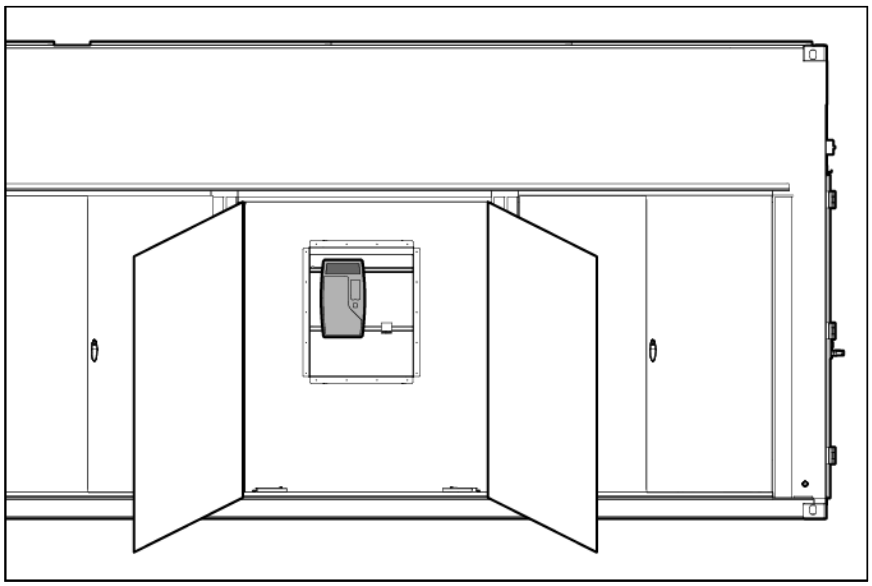
5. Replace the chilled water temperature sensor cover (1).

Heat exchanger

HP service personnel is required to replace this spare component. Please contact HP Services for assistance.

Humidifier

The humidifier is located in the cold aisle humidifier bump out.

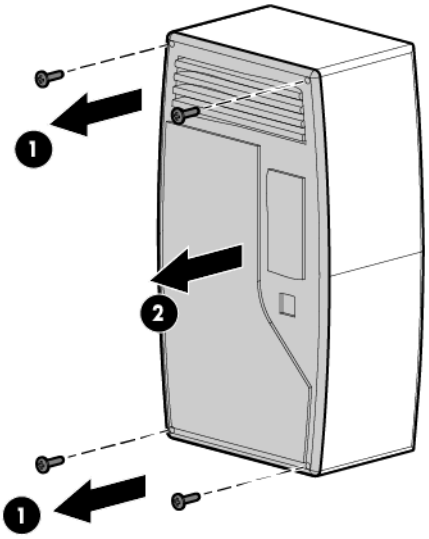


You need a Phillips-head screwdriver for installation.

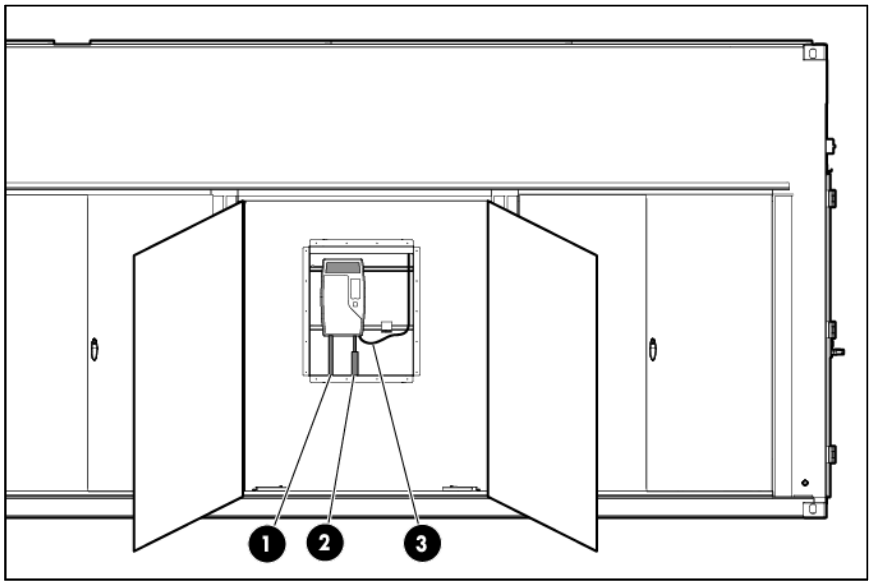
Removing the humidifier

1. Hold the drain button on the humidifier exterior until the humidifier cylinder drains completely.
2. Press the power button on the outside of the humidifier to power down the humidifier.
3. Close the water supply isolation valve on the HP POD 20c exterior.
4. Disconnect the water supply line to the humidifier on the HP POD 20c exterior to relieve the water pressure.
5. Open and danger tag the associated circuit breaker in the ECS cabinet. The circuit breakers are identified on the panel schedule.

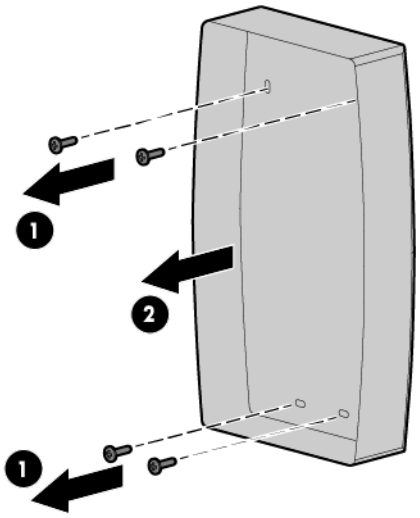
6. Remove the four screws on the corners of the humidifier cover (1), and then remove the cover (2).



7. Locate the power board and disconnect the two internal electrical wires.
8. Disconnect the drain (1).
9. Disconnect the humidifier from the water supply line (2).
10. Disconnect and remove the external electrical wiring from the housing (3).

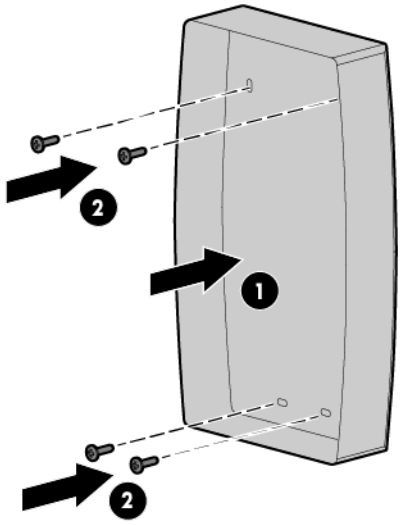


11. Remove the four screws that secure the humidifier body to the wall (1), and then remove the humidifier (2).



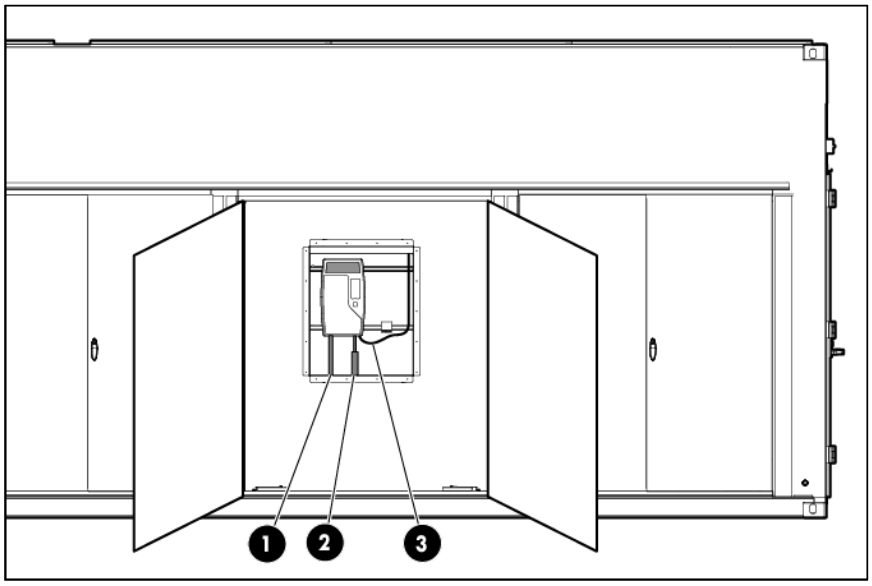
Replacing the humidifier

1. Replace the humidifier (1), and then secure the humidifier to the wall with four screws (2).

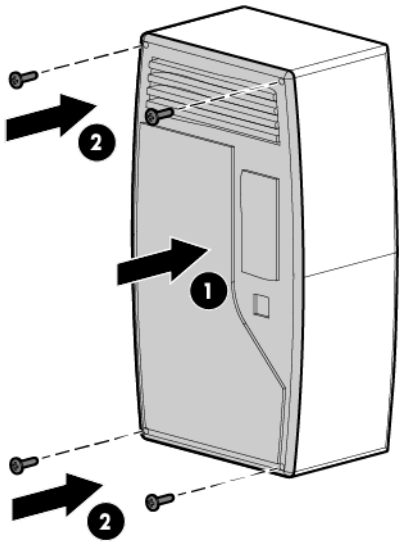


2. Connect the drain (1).
3. Connect the humidifier to the water supply line (2).

4. Route and connect the external electrical wiring to the housing (3).



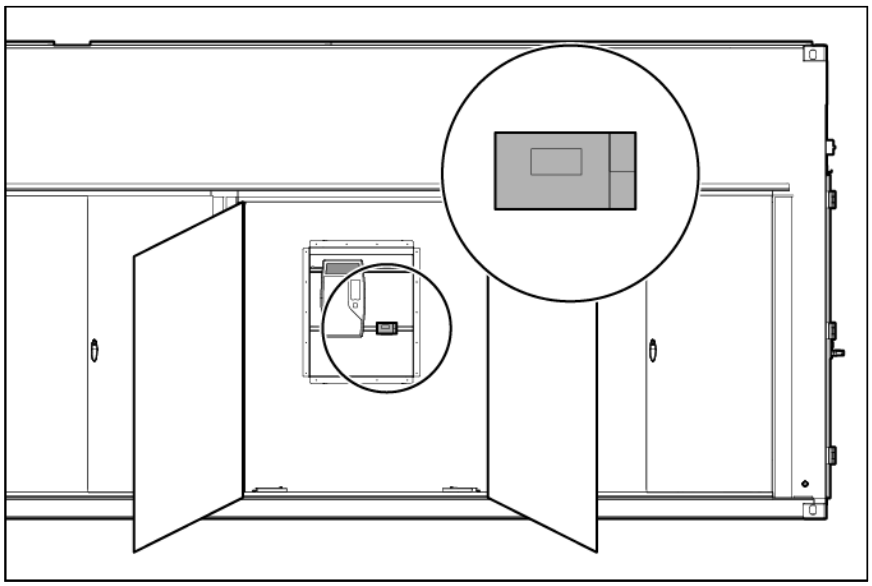
5. Locate the power board and connect the two internal electrical wires.
6. Replace the humidifier cover (1), and then secure the cover with four screws (2).



7. Open the water supply isolation valve on the HP POD 20c exterior.
8. Connect the water supply line to the humidifier on the HP POD 20c exterior.
9. Close the associated circuit breaker in the ECS cabinet.
10. Press the power button on the outside of the humidifier to power up the humidifier.

Humidistat (if installed)

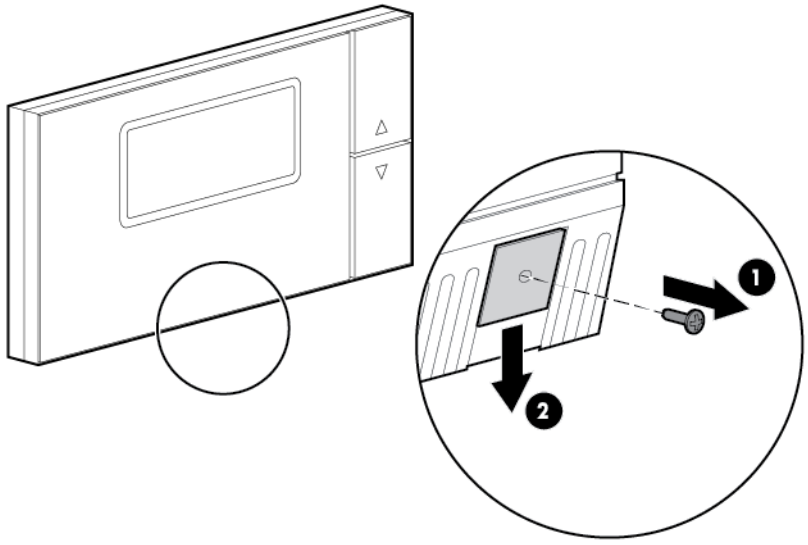
The humidistat is located in the cold aisle humidifier bump out.



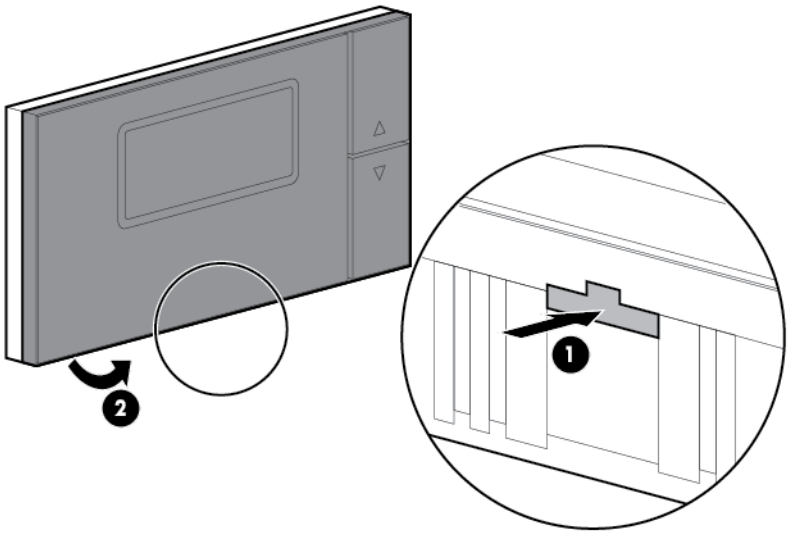
You need a screwdriver to remove and replace the humidistat.

Removing the humidistat

1. Press the power button on the outside of the humidifier to power down the humidifier.
2. Open and danger tag the associated circuit breaker in the ECS cabinet. The circuit breakers are identified on the panel schedule.
3. Detach the front panel of the humidistat from the mounting base:
   a. Remove the screw securing the tab in the opening (1), and then slide the tab to the open position (2).



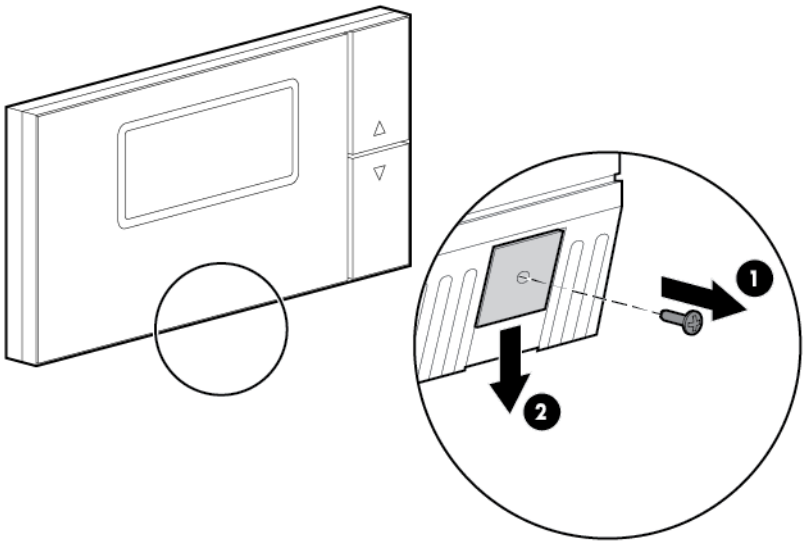
b. Use a flathead screwdriver to press the release button (1), and then pull the front panel from the bottom to detach the panel (2). The two parts remain connected by a flat cable.



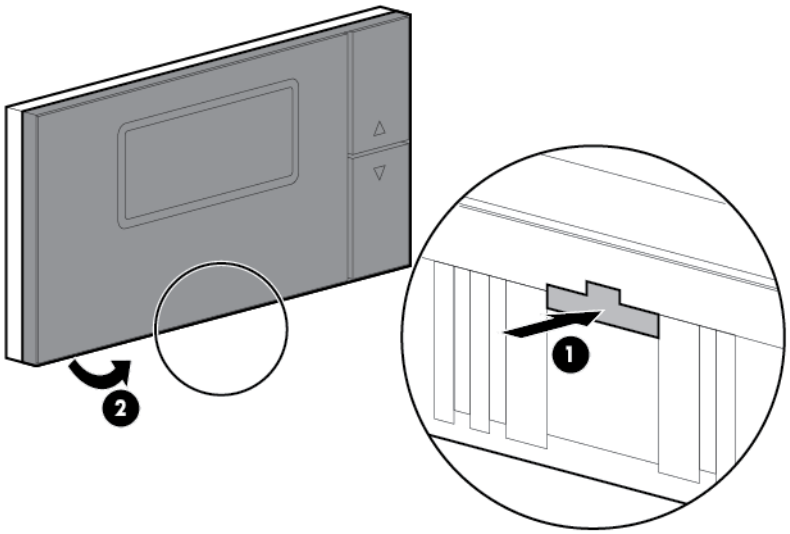
4. Squeeze the two terminal cover fins to remove the cables from the terminal block.
5. Remove the screws securing the mounting base to the wall.

Replacing the humidistat

1. Detach the front panel of the replacement humidistat from the mounting base.
   a. Remove the screw securing the tab in the opening (1), and then slide the tab to the open position (2).



b. Use a flathead screwdriver to the press the release button (1), and then pull the front panel from the bottom to detach the panel (2). The two parts remain connected by a flat cable.



2. Secure the mounting base to the wall using the screws provided.
3. Squeeze the two terminal cover fins to remove the terminal covers.
4. Make the required connections by running the connection cables through the center hole in the bottom of the mounting base and connecting the cables to the terminal block.
5. Separate the connection and control cables from the relay cables.
6. Attach the front panel.
7. Close the associated circuit breaker in the ECS cabinet.
8. Press the power button on the outside of the humidifier to power up the humidifier.

Valves

External chilled water isolation valve

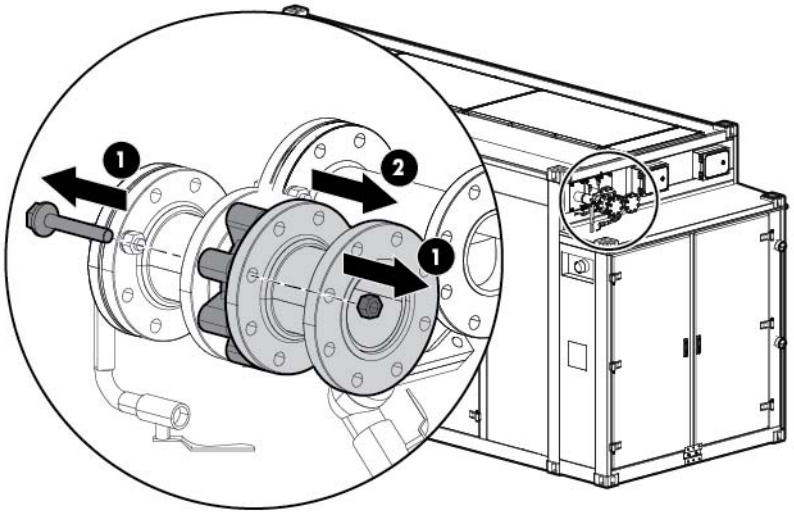
The external chilled water isolation valve is the butterfly valve located on top of the HP POD 20c.

You need a wrench for installation.

Removing the external chilled water isolation valve

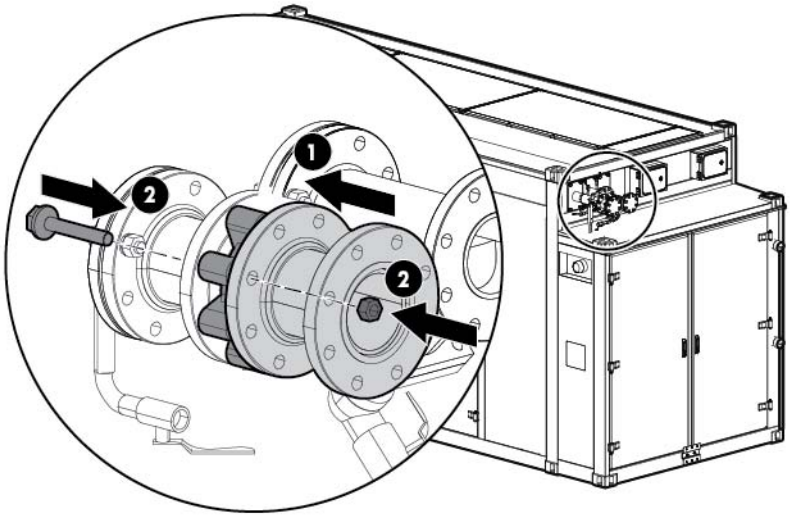
1. Remove the eight bolts surrounding the valve (1).

2. Remove the valve (2).



Replacing the external chilled water isolation valve

1. Replace the valve (1).
2. Secure the valve with eight bolts (2).



External pressure gauge isolation valve

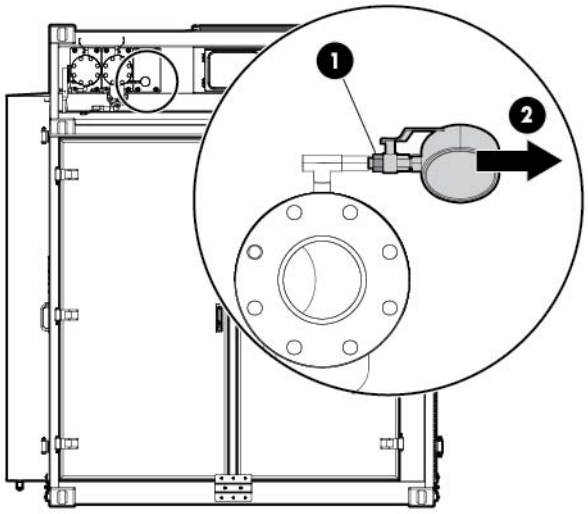
The external pressure gauge isolation valve is located on top of the HP POD 20c.

You need an adjustable wrench or an appropriately sized box wrench for installation.

Removing the external pressure gauge isolation valve

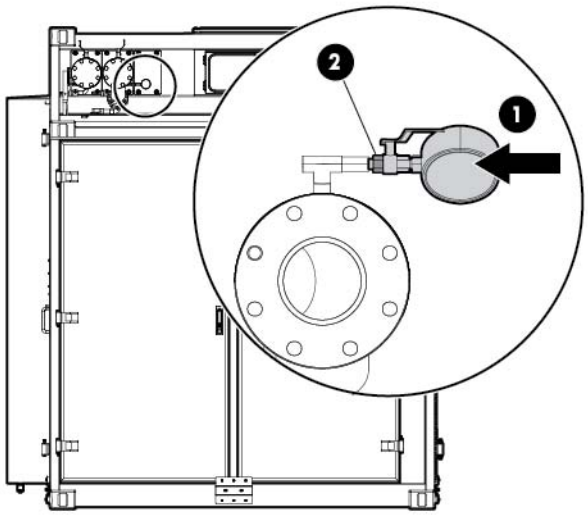
1. Loosen the connection securing the valve (1)

2. Remove the valve (2).



Replacing the external pressure gauge isolation valve

1. Insert the new valve (1).
2. Tighten the connection (2).



Periodic maintenance

Periodic maintenance overview

Perform periodic inspections on the components in this section to be sure that the HP POD 20c continues to perform within the designed parameters.

Qualified personnel

Qualified personnel are identified as personnel who are:

- Properly trained in the operation and maintenance of the HP POD 20c
- Customer-authorized to conduct maintenance activities

Qualified personnel can be:

- HP personnel
- Agents for HP
- Site maintenance personnel

Cooling system

Component to be inspected	Task	Frequency	Capable Party
Air filters	Inspect and replace as necessary	As needed (at least quarterly)	Qualified personnel
Air filter differential pressure sensor	Inspect and replace as necessary	Annually	Qualified personnel
Cooling system leak check	Verify that there is no visible chilled water leakage from the: • Heat Exchanger • CWS piping • CWR piping If a leak is detected, see "Leak detection (on page 62)."	Quarterly	Qualified personnel
Condensate drain pans	Inspect and verify that the: • Pans are free of debris • Pans have no leaks • Leakage detectors are in proper position Clean pans as necessary	Quarterly	Qualified personnel
Condensate drain pan sensors	Inspect, test, and replace as necessary. If a leak is detected, see "Leak detection (on page 62)."	Quarterly	Qualified personnel

Component to be inspected	Task	Frequency	Capable Party
Condensate drain lines and p-trap	Inspect and verify that: • There is no internal blockage of the drain line • Condensate can freely pass • P-traps are intact and not leaking • There is no blockage of the drain line that is external to the site drain Clean and clear debris as necessary.	Quarterly	Qualified personnel
Heat exchanger fans	Inspect and verify that the following components are properly secured and operational: • Fan • Fan mounting • Wiring harness • Power modules (located in the ECS cabinet)	Quarterly	Qualified personnel
Chilled water header drain pan and lines	Visually check drains for internal and external blockage	• Monthly, if staffed • Quarterly, if not staffed	Qualified personnel
—	Conduct an operational check of the external site drain using approximately 5 gallons of water (if possible)	Annual	Qualified personnel

Leak detection

The HP POD 20c includes six heat exchanger condensate sensors. Three sensors are located in the drain pans below each set of heat exchangers, and three sensors are located in the chilled water supply and return header drain pan tray.

Some amount of condensation water can always be expected in the heat exchanger drain pans. If an excessive amount of condensation water accumulates in a drain pan, an alarm is triggered and sent through the HP POD 20c ECS, which indicates a possible leak.

There should be no water in the chilled water supply and return header drain pan. The drain pan should always remain dry.

Leak isolation

⚠ **WARNING:** To reduce the risk of electric shock or damage to the equipment, use extreme caution when removing and replacing components that involve water around the electrical equipment. There is great risk of electrical shock when water is used near electricity.

CAUTION: If a serious leak develops, shut down the POD immediately and isolate the chilled water cooling system from the site. Contact HP immediately to initiate a field service call. Do not attempt to repair the chilled water cooling system. Attempting to self-repair the chilled water cooling system during the warranty or service contract period shifts all liability to you.

IMPORTANT: Power down the POD after a leak is detected.

Non-isolable leak detection

A non-isolable leak is a leak from the main supply line or the return header.

To repair a non-isolable leak:

1. Power down all IT equipment.
2. Re-direct the leaking water away from the IT equipment.
3. Repair the leak or contact HP if you are still within your service contract.

Isolable leak detection

An isolable leak is any type of leak that does not occur from the main supply line or the return header.

To repair an isolable leak:

1. Inspect the zone indicated on the ECS Status Overview screen. You might need to inspect each zone condensate drain pan to determine the exact location of the leak.
2. Power down the IT equipment in the zone where the leak is located.
3. Determine the affected heat exchanger.
4. Close and danger tag the supply and return valves to the affected heat exchanger.

   If the heat affected exchanger cannot be identified, close all the heat exchanger supply and return valves in the affected zone and open one supply valve at a time to determine the location of the leak.
5. Repair the leak or contact HP if you are still within your service contract.

Humidifier (if installed)

Component to be inspected	Task	Frequency	Capable Party
Humidifier	• Inspect for water leaks, verify that no sparks form between the electrodes during operation • Inspect the general operation of the cylinder.	• Bi-weekly, if staffed • Quarterly, if not staffed	Qualified personnel
Humidifier drains	Verify the following: • Drains are in working order • There is an air gap at the funnel/drain entry into the site system • Drain discharge is not getting water on external equipment or grounding system	Quarterly	Qualified personnel

Component to be inspected	Task	Frequency	Capable Party
Humidifier drains	Put the humidifier in system flush mode and inspect drain flow and water supply flow. Inspect, clean, and/or replace as necessary.	Quarterly	Qualified personnel
—	Inspect for any internal or external water leaks, repair or replace leaking components.	Quarterly	Qualified personnel
—	Using LLS, verify proper cylinder operation. Inspect the cylinder for blackened areas and, if present, check the condition of the electrodes. If necessary, replace the cylinder.	Quarterly	Qualified personnel
—	Replace the cylinder.	Annually	Qualified personnel

ECS

Component to be inspected	Task	Frequency	Capable Party
Full system functional check	Operational check of all system components	Quarterly	Qualified personnel
—	Check and clear alarm log	Quarterly	Qualified personnel
—	Inspect and test ECS battery backup system	Every 2 years	Qualified personnel

Electrical

Maintenance of the electrical components might require the following:

- Expose personnel to high voltage.
- Allow personnel to come into direct contact with high voltage.
- Power down the POD during the execution of the maintenance item.

You must explicitly state and acknowledge if a POD power down will be possible. If a power down is not possible, LLS inspections will be conducted and further action will be taken at your discretion.

Component to be inspected	Task	Frequency	Capable Party
Electrical connections	Use LLS to check for major electrical connections (torque marks, sizzle, and acrid odor): • Main/House Power Feeds • Busway End Feeds, Drop Boxes (including cables and cord caps) • Electrical panels, breakers, and disconnects • 480/415 VAC transformer	Quarterly	Licensed electrician

Component to be inspected	Task	Frequency	Capable Party
—	**POD SHUT DOWN REQUIRED** Conduct torque checks on the following: • Main/House Power Feeds • Electrical panels, breakers, and disconnects • Busway End Feeds and Drop Box locking mechanism (bolt)	Annually	Licensed electrician
Grounding	Grounding system residence test using the DUCTOR method	Every 2 years	Licensed electrician
—	**POD SHUT DOWN REQUIRED** Ground and grounding connection/lug located internal to each electrical panel torque test. Clean and re-tighten as necessary.	Every 2 years	Licensed electrician
—	Service entrance grounding ground-rod/ground well and grounding connection/lug located external to the POD torque test. Clean and re-tighten as necessary.	Every 2 years	Licensed electrician
—	**POD SHUT DOWN REQUIRED** Service entrance ground connection/lug located on the switchboard (or landing location) torque test. Clean and re-tighten as necessary.	Every 2 years	Licensed electrician
—	Grounding system bonding jumpers that connect racks to the POD structure and rack to rack torque test. Clean and re-tighten as necessary.	Every 2 years	Licensed electrician
Circuit breakers	Panel breaker operational test (open and shut).	Annually	Licensed electrician/Qualified personnel
—	LLS inspection of breakers, disconnects, motor starters, and fuse holders (physical).	Quarterly	Licensed electrician/Qualified personnel
—	Breaker fault testing for all breakers ≥ 250AF	Every 3 years	Third party testing facility
Sensors	Verify proper operation of: • Internal POD temperature sensors (thermometer) • Relative humidity sensors (RH meter) (Investigate discrepancies, trouble shoot, and replace as necessary.)	Annually	Qualified personnel

Component to be inspected	Task	Frequency	Capable Party
—	Compare the following with site indications (if available): • CWS/CWR temperature • CWS/CWR pressure • Flow rate (if possible) (Investigate discrepancies, trouble shoot, and replace as necessary.)	Annually	Qualified personnel
—	**POD SHUT DOWN REQUIRED** Calibrate (zero out) POD differential pressure sensors. (Investigate discrepancies, trouble shoot, and replace as necessary.)	Annually	Qualified personnel
Lighting	Visual inspection of lighting fixtures and lamps. Replace components upon failure.	As needed or Quarterly	Licensed electrician/ Qualified personnel

Fire alarm and suppression system

Component to be inspected	Task	Frequency	Capable Party
Full system functional check	Inspect and perform a functional check of the system.	As required by local code	Authorized technician
Fire panel	Inspect and test fire panel battery backup system.	Bi-annually	Authorized technician
VESDA	Inspect and test VESDA power supply.	Quarterly	Authorized technician
—	Inspect the VESDA pipe network.	Bi-annually	Authorized technician
—	Inspect the VESDA filter. Replace as necessary.	Annually	Authorized technician
—	Conduct a VESDA pipe integrity smoke test.	Annually	Authorized technician
—	Check the VESDA pipe flow.	Annually	Authorized technician
—	Clean the VESDA sampling points.	Every 2 years	Authorized technician
—	Flush the VESDA pipe network.	Every 2 years	Authorized technician
—	VESDA system air sampling/smoke test	As required by local code	Authorized technician
Suppression system	Suppression system test	As required by local code	Authorized technician
—	Fire-pull visual and operational inspection	As required by local code	Authorized technician
—	Fire strobe and horn visual and operational inspection	As required by local code	Authorized technician

HP POD 20c structure

Component to be inspected	Task	Frequency	Capable Party
Complete structure	Visually inspect the structural integrity.	Annually	Qualified personnel

Component to be inspected	Task	Frequency	Capable Party
—	Inspect the door operation and inspect the door gaskets for water and air leaks.	Annually	Qualified personnel
—	Visually inspect the paint. Perform prep and touch-up as necessary.	Annually	Qualified personnel

Life safety

Component to be inspected	Task	Frequency	Capable Party
Manual EPO shunt trip	**EPO FUNCTIONAL TEST** Manually initiate EPO with the internal and external push buttons (if installed) in succession. (Verify all shunt-trips on all panels trip.)	Annually	Qualified personnel
Thermal EPO shunt trip	**EPO FUNCTIONAL TEST** Initiate a thermal (automatic) EPO shutdown via the EPO temperature switches located in the hot aisle. (Verify all shunt-trips on all panels trip.)	Annually	Qualified personnel
EPO System Test	**EPO NON-FUNCTIONAL TEST** Mode Key Switch Test - rotate keyed switch through all modes. ARMED MODE - Verify: • Power Indicator - White • Armed Light - White BYPASS MODE - Verify • Bypass Light - Green TEST MODE - Verify: • Test Light - Amber Press EPO button (each in succession) and thermal trip to verify: • Reset Light - White • Audible alarm • Visual lamp indicator Replace light upon failure	Annually	Qualified personnel
Emergency Lighting	Verify emergency lighting is visible when all lighting is off and the POD doors are shut.	Every 2 years	Qualified personnel
Exit signs	Visually inspect Tritium exit signs for operation or damage. Replace as necessary.	Every 2 years	Qualified personnel
Emergency egress	Personnel door emergency egress panic bars. (Visual and operational inspection.)	Bi-annually	Qualified personnel

Access control

Component to be inspected	Task	Frequency	Capable Party
System functional test	Visual inspection and operational test of door access contact switches	Annually	Qualified personnel
—	Visual inspection and operational test of the following: • Door access card readers • Electric strikes • Door release switches at each personnel door and/or in each personnel door panic bar	Annually	Qualified personnel

Third-party components

All maintenance for third-party equipment will be defined by the manufacturer of the equipment. HP will, with a defined and signed SOW, conduct all maintenance as identified by the original manufacturer.

Examples of external third party components that HP will conduct all manufacturer specified maintenance with a signed SOW includes:

- External UPS equipment

  Internal UPS and rack equipment that is purchased from HP is covered by a standard HP warranty and services contract, purchased separately.
- Generators
- Switchgear

For maintenance activities for all third party equipment purchased as part of and delivered with the HP POD 20c, see the *Operations and Maintenance Manual for the HP Performance Optimized Datacenter 20c*. This manual might not cover equipment purchased through Critical Facilities Services.

Specifications

General HP POD 20c specifications

Features	Specifications
Overall dimensions	• Height—3.05 m (10 ft) • Length—6.10 m (20 ft) • Width—2.43 m (7.97 ft)
Weight[1]	• Empty—7,711 kg (17,000 lb) • Maximum fully loaded—22,680 kg (50,000 lb)
Maximum power[2]	288 kW
Power input voltage	480 V, 3-phase, 4-wire
Power input current	2 x 320 A 3-phase, 3-wire feeders
Maximum rack quantity	10 racks
Rack Units (RU) per rack	50 RU
Rack Units (RU) total	500 RU
Average capacity per rack (kW)	30 kW
Peak rack capacity	69 kW
Voltage to rack	200-240 VAC
Minimum quantity of PDUs per HP POD 20c	10 (one per rack)
Maximum quantity of PDUs per HP POD 20c	20 (two per rack)
Maximum power per PDU	30A = 17 kW; 60A = 34 kW
Network supported	• Bulk cable pass-through-fiber • Bulk cable pass-through-copper • External rated DEMARC box

[1]The empty weight includes the HP POD 20c structure, empty racks, PDUs, and drop boxes. It does not include IT equipment.
[2]The maximum power depends on the exact installation and power configuration in your POD. The HP POD 20c is electrically limited to 288 kW.

Electrical specifications

Electrical busway system information

Feature	Specification
Number of busways	2
Frequency	60 Hz
Amps (per busway)	200 A
Voltage (per busway)	380-415 Y
Grounding	Copper
Busway configuration	3-phase + neutral + equipment ground

Fire alarm panel connections

The electrical layout of the fire alarm system is as described in the schematic drawing supplied with the HP POD 20c.

Water specifications

The following table describes the chilled water system specifications for the HP POD 20c.

Feature	Specification
Facility input temperature to the HP POD 20c	12° to 24°C (55° to 75°F)
Working pressure	1,034 kPa (150 psi)
HP POD 20c pressure drop	172.4 kPa (25 psi)
HP POD 20c water flow rate	454 lpm (120 gpm)
Chilled water supply and return connections	Two DIN PN16 DN80 flanges

Rack specifications

Standard HP POD 20c racks (AT978A)

Feature	Specification
U height	50U
Width	54.6 cm (21.5 in)
Depth	99 cm (39 in)*
Maximum load weight	1,360.7 kg (3,000 lb)

*This specification indicates the maximum clearance for the cold aisle. Equipment cannot exceed this measurement.

Thermal and air flow performance

Maximum thermal and air flow performance parameters	HP POD 20c specification
Air temperature—Inlet to rack-mounted components	Dependent on IT configuration and chilled water inlet temperature
Chilled water temperature	12°C to 24°C (55°F to 75°F)
Total rack-mounted component air flow	Variable as required to maintain hot aisle setpoint temperature and dependent on IT configuration
Heat rejection capacity	300 kW

Environmental specifications

Feature	Specification
Operating temperature	-28°C to 54°C (-18°F to 130°F)
Non-operating temperature*	-29°C to 54°C (-20°F to 130°F)

Feature	Specification
Operating humidity	• 0% to 100% external • 10% to 90% non-condensing internal
Non-operating humidity*	• 5% to 95% relative non-condensing • 39°C (102°F) maximum wet bulb temperature
Operating altitude	-76.2 m to 3,048 m (-250 ft to 10,000 ft)
Non-operating altitude	-76.2 m to 9,144 m (-250 ft to 30,000 ft)

*For non-operating specifications, consider the temperature of computer and IT equipment inside the HP POD 20c.

Optional features specifications

Feature	Specification
Fire suppression	3M Novec 1230 or FM200 fire extinguishing system provided in two canisters (main and reserve)
Card reader	12-key pad with 125 KHz proximity and 13.56 MHz contactless smart card
Humidifier	Provides 0.9-3.63 kg/hr (2-8 lb/hr) of water vapor into cold aisle to maintain POD environment within 20% to 80% relative humidity

Contacting HP

Before you contact HP

Be sure to have the following information available before you call HP:

- Active Health System log (HP ProLiant Gen8 or later products)

  Download and have available an Active Health System log for 3 days before the failure was detected. For more information, see the *HP iLO 4 User Guide* or *HP Intelligent Provisioning User Guide* on the HP website (http://www.hp.com/go/ilo/docs).
- Onboard Administrator SHOW ALL report (for HP BladeSystem products only)

  For more information on obtaining the Onboard Administrator SHOW ALL report, see the HP website (http://www.hp.com/go/OAlog).
- Technical support registration number (if applicable)
- Product serial number
- Product model name and number
- Product identification number
- Applicable error messages
- Add-on boards or hardware
- Third-party hardware or software
- Operating system type and revision level

HP contact information

For United States and worldwide contact information, see the Contact HP website (http://www.hp.com/go/assistance).

In the United States:

- To contact HP by phone, call 1-800-334-5144. For continuous quality improvement, calls may be recorded or monitored.
- If you have purchased a Care Pack (service upgrade), see the Support & Drivers website (http://www8.hp.com/us/en/support-drivers.html). If the problem cannot be resolved at the website, call 1-800-633-3600. For more information about Care Packs, see the HP website (http://pro-aq-sama.houston.hp.com/services/cache/10950-0-0-225-121.html).

Regulatory information

HP POD 20c regulatory compliance

IMPORTANT: All regulatory information applies to HP POD 20c—International and HP POD 20c—North America only. HP POD 20c - China is designed according to the same requirements, but it is not a listed product and has not been verified by the governing body.

The HP POD 20c complies with the following regulatory standards.

Standard	Certification level	Standard title
UL 60950	ETL "Listed"	• UL 60950—*Standard for Safety Information Technology Equipment, Part 1: General Requirements*, Issue: 2007/03/27, Edition: 2 • UL 60950—*Standard for Safety Information Technology Equipment, Part 22: Equipment to be Installed Outdoors*, Issue: 2007/04/23, Edition: 1
NFPA 70	ETL "Classified"	NFPA 70—*National Electric Code, 2008 Edition*, © 2008 National Fire Protection Association
NFPA 72	Designed to Comply With	*National Fire Alarm code, 2007 Edition*, © 2006 National Fire Protection Association
NFPA 2001	Designed to Comply With	*NFPA 2001, Standard on Clean Agent Fire Extinguishing Systems, 2008 Edition*, © 2008 National Fire Protection Association
IBC 2009	Designed to Comply With	*2009 International Building Code*, © 2010 International Code Council, Inc.

Safety and NEC compliance

The HP POD 20c is certified to UL 69050-1/IEC 60950-22 as an Information Technology Product and classified according to the National Electric Code NFPA 70. For more information, see "HP POD 20c regulatory compliance."

The HP POD 20c is not suitable for long-term human occupancy. The HP POD 20c is Listed as a Product that provides service access areas for periodic maintenance and service. These areas must be used only by owner-authorized and qualified personnel who are trained in the maintenance and service of the HP POD 20c components.

IMPORTANT: Before installing the HP POD 20c, consult your local AHJ for applicable regulations and to review site-specific location guidelines. If needed, obtain any necessary permits.

Additional considerations for safety and NEC compliance are as follows:

- The HP POD 20c is listed as an Information Technology Product to UL 60950.
- The HP POD 20c is evaluated as a "non-inhabitable product" that provides "service access" areas for customer-authorized, qualified, and trained service personnel.

- The electrical connections of the HP POD 20c are evaluated as feeder connections for connection to an existing facility, and are not suitable as "service entrance" for connection to the utility.
- The HP POD 20c is designed for stationary installation outdoors in a Pollution Degree 3 environment, in restricted access locations, with field wiring terminals provided for permanent supply connections.
- The HP POD 20c meets the following ratings.

Feature	Specification
Category	Rated Overvoltage Category III
Protection	Surge protection device
Class	Class1
Ambient temperature	2°C to 54°C (35.6°F to 129.2°F)
Relative humidity	0% to 100% humidity

- As part of the overall certification, relevant sections of the International Building Code have been applied as part of the design and evaluation. The current design supports wind loads up to 90 mph.

Regulatory requirements for EXIT signs

Manufacturers of tritium EXIT signs are “specific licensees,” meaning they are licensed by the NRC or an Agreement State. The signs are considered “generally licensed devices,” because they are inherently safe enough to be handled or used by anyone with no radiation training or experience. Although purchasers – known as “general licensees” – do not need authorization from the NRC or a state regulatory agency to possess the signs, they are subject to certain regulatory requirements regarding handling, transfer or disposal of the signs. For more information, see the NRC website (http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/fs-tritium.html#_edn2). They are also subject to NRC or Agreement State inspection and enforcement action (including fines) for violating those requirements. Manufacturers must inform purchasers of the EXIT signs of the regulatory requirements for generally licensed devices. The general licensee is required to designate an individual responsible for complying with the regulatory requirements.

Under NRC regulations, a general licensee using tritium EXIT signs:

- must NOT remove the labeling or radioactive symbol, or abandon a sign;
- must properly dispose of an unused sign (see below);
- must report to the NRC or the appropriate Agreement State any lost, stolen or broken signs;
- must inform the NRC or an Agreement State of a name change, change of address or replacement of a general licensee’s designated representative;
- must NOT give away or sell the sign to another individual, company or institution unless the device is to remain in use at its original intended location; in such a case, the transferor is to notify the recipient of the regulatory requirements and must notify the NRC or Agreement State of the transfer within 30 days.

Tritium EXIT signs must NOT be disposed of as normal trash. To dispose of a sign properly, a general licensee must transfer the sign to a specific licensee. This would typically be a manufacturer, distributor, licensed radioactive waste broker, or a licensed low-level radioactive waste disposal facility. These facilities may charge a fee for this service.

Within 30 days of disposing of a sign, the general licensee is required to file a report to the NRC or Agreement State that includes:

- the device manufacturer's (or distributor's) name, model number and serial number;
- the name, address, and license number of the person receiving the device; and
- the date of the transfer.

Reports should be sent to Director, Office of Federal and State Materials and Environmental Management Programs, ATTN: GLTS, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555-0001.

For more information, see the Fact Sheet on Tritium EXIT Signs on the NRC website (http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/fs-tritium.html).

Safety and regulatory compliance

For safety, environmental, and regulatory information, see *Safety and Compliance Information for Server, Storage, Power, Networking, and Rack Products*, available at the HP website (http://www.hp.com/support/Safety-Compliance-EnterpriseProducts).

Warranty information

HP ProLiant and X86 Servers and Options (http://www.hp.com/support/ProLiantServers-Warranties)

HP Enterprise Servers (http://www.hp.com/support/EnterpriseServers-Warranties)

HP Storage Products (http://www.hp.com/support/Storage-Warranties)

HP Networking Products (http://www.hp.com/support/Networking-Warranties)

HP POD 20c regulatory compliance

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NFPA 72	Designed to Comply With	*National Fire Alarm code, 2007 Edition*, © 2006 National Fire Protection Association
NFPA 2001	Designed to Comply With	*NFPA 2001, Standard on Clean Agent Fire Extinguishing Systems, 2008 Edition*, © 2008 National Fire Protection Association
IBC 2009	Designed to Comply With	*2009 International Building Code*, © 2010 International Code Council, Inc.

Glossary

branch circuit

The conductors and components following the last overcurrent protective device protecting a load.

cover

An unhinged portion of an enclosure that covers an opening.

door

A hinged portion of an enclosure that covers an opening.

ECS

environmental control system

EPO

emergency power off

equipment

A general term, including fittings, devices, appliances, luminaries, apparatus, machinery, and the like used as a part of, or in connection with, a modular data center. (Source: NEC.)

fuse, branch circuit type

A fuse of Class CC, G, H, J, K, L, R, and T. These fuses are able to provide branch circuit protection.

fuse, supplementary type

Miscellaneous type and miniature type fuses. These fuses are able to provide supplementary protection only.

LLS

LLS means look, listen, and sniff. Use your visual, auditory, and olfactory senses to detect electrical fires.

PDU

power distribution unit

PLC

programmable logic controller

power circuit

Conductors and components of branch and feeder circuits.

RU

rack units

SOW

statement of work

structure

Enclosure of sufficient size to enable entry of personnel.

UPS

uninterruptible power system

VESDA

very early smoke detection apparatus

Documentation feedback

HP is committed to providing documentation that meets your needs. To help us improve the documentation, send any errors, suggestions, or comments to Documentation Feedback (mailto:docsfeedback@hp.com). Include the document title and part number, version number, or the URL when submitting your feedback.

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